

U.S. Department of Education
Washington, D.C. 20202-5335



**APPLICATION FOR GRANTS
UNDER THE**

2015 Enhanced Assessment Grant (EAG)

CFDA # 84.368A

PR/Award # S368A150013

Grants.gov Tracking#: GRANT11950668

OMB No. , Expiration Date:

Closing Date: Jun 29, 2015

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This application was generated using the PDF functionality. The PDF functionality automatically numbers the pages in this application. Some pages/sections of this application may contain 2 sets of page numbers, one set created by the applicant and the other set created by e-Application's PDF functionality. Page numbers created by the e-Application PDF functionality will be preceded by the letter e (for example, e1, e2, e3, etc.).

D(1)

Application for Federal Assistance SF-424

* 1. Type of Submission: <input type="checkbox"/> Preapplication <input checked="" type="checkbox"/> Application <input type="checkbox"/> Changed/Corrected Application	* 2. Type of Application: <input checked="" type="checkbox"/> New <input type="checkbox"/> Continuation <input type="checkbox"/> Revision	* If Revision, select appropriate letter(s): <input type="text"/> * Other (Specify): <input type="text"/>
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* 3. Date Received: <input type="text" value="06/29/2015"/>	4. Applicant Identifier: <input type="text"/>
--	--

5a. Federal Entity Identifier: <input type="text"/>	5b. Federal Award Identifier: <input type="text" value="NA"/>
--	--

State Use Only:

6. Date Received by State: <input type="text"/>	7. State Application Identifier: <input type="text"/>
---	---

8. APPLICANT INFORMATION:

* a. Legal Name:

* b. Employer/Taxpayer Identification Number (EIN/TIN): <input type="text" value="48-6029925"/>	* c. Organizational DUNS: <input type="text" value="8798970980000"/>
--	---

d. Address:

* Street1:
Street2:
* City:
County/Parish:
* State:
Province:
* Country:
* Zip / Postal Code:

e. Organizational Unit:

Department Name: <input type="text"/>	Division Name: <input type="text"/>
--	--

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: * First Name:
Middle Name:
* Last Name:
Suffix:

Title:

Organizational Affiliation:

* Telephone Number: <input type="text" value="785 296-7922"/>	Fax Number: <input type="text"/>
---	----------------------------------

* Email:

Application for Federal Assistance SF-424

*** 9. Type of Applicant 1: Select Applicant Type:**

A: State Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

* Other (specify):

*** 10. Name of Federal Agency:**

U.S. Department of Education

11. Catalog of Federal Domestic Assistance Number:

84.368

CFDA Title:

Grants for Enhanced Assessment Instruments

*** 12. Funding Opportunity Number:**

ED-GRANTS-042815-002

* Title:

Office of Elementary and Secondary Education (OESE): Enhanced Assessment Instruments Grants Program: Enhanced Assessment Instruments CFDA Number 84.368A;

13. Competition Identification Number:

84-368A2015-1

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):

Add Attachment

Delete Attachment

View Attachment

*** 15. Descriptive Title of Applicant's Project:**

Use of Learning Maps as an Organizing Structure for Formative Assessment

Attach supporting documents as specified in agency instructions.

Add Attachments

Delete Attachments

View Attachments

Application for Federal Assistance SF-424

16. Congressional Districts Of:

* a. Applicant

* b. Program/Project

Attach an additional list of Program/Project Congressional Districts if needed.

17. Proposed Project:

* a. Start Date:

* b. End Date:

18. Estimated Funding (\$):

* a. Federal	<input type="text" value="1,319,514.00"/>
* b. Applicant	<input type="text" value="0.00"/>
* c. State	<input type="text" value="0.00"/>
* d. Local	<input type="text" value="0.00"/>
* e. Other	<input type="text" value="0.00"/>
* f. Program Income	<input type="text" value="0.00"/>
* g. TOTAL	<input type="text" value="1,319,514.00"/>

*** 19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

- a. This application was made available to the State under the Executive Order 12372 Process for review on
- b. Program is subject to E.O. 12372 but has not been selected by the State for review.
- c. Program is not covered by E.O. 12372.

*** 20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes," provide explanation in attachment.)**

Yes No

If "Yes", provide explanation and attach

21. *By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

** I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix: * First Name:
Middle Name:
* Last Name:
Suffix:

* Title:

* Telephone Number: Fax Number:

* Email:

* Signature of Authorized Representative: * Date Signed:

Congressional Districts:

Kansas:

KS-all

Alaska:

AK-all

Iowa:

IA-all

Missouri:

MO-all

Wisconsin:

WI-all

ASSURANCES - NON-CONSTRUCTION PROGRAMS

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0040), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.
7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.
10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).
14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.
15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.
16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
19. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

<p>SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL</p> <p>Nancy Lister</p>	<p>TITLE</p> <p>Grant Administrator</p>
<p>APPLICANT ORGANIZATION</p> <p>Kansas State Department of Education</p>	<p>DATE SUBMITTED</p> <p>06/29/2015</p>

Standard Form 424B (Rev. 7-97) Back

DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C.1352

Approved by OMB
0348-0046

1. * Type of Federal Action: <input type="checkbox"/> a. contract <input checked="" type="checkbox"/> b. grant <input type="checkbox"/> c. cooperative agreement <input type="checkbox"/> d. loan <input type="checkbox"/> e. loan guarantee <input type="checkbox"/> f. loan insurance	2. * Status of Federal Action: <input type="checkbox"/> a. bid/offer/application <input checked="" type="checkbox"/> b. initial award <input type="checkbox"/> c. post-award	3. * Report Type: <input checked="" type="checkbox"/> a. initial filing <input type="checkbox"/> b. material change
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4. Name and Address of Reporting Entity:
 Prime SubAwardee

* Name

* Street 1 Street 2

* City State Zip

Congressional District, if known:

5. If Reporting Entity in No.4 is Subawardee, Enter Name and Address of Prime:

6. * Federal Department/Agency: <input type="text" value="Not Applicable"/>	7. * Federal Program Name/Description: <input type="text" value="Grants for Enhanced Assessment Instruments"/>
	CFDA Number, if applicable: <input type="text" value="84.368"/>

8. Federal Action Number, if known: <input type="text"/>	9. Award Amount, if known: \$. <input type="text"/>
--	---

10. a. Name and Address of Lobbying Registrant:

Prefix * First Name Middle Name

* Last Name Suffix

* Street 1 Street 2

* City State Zip

b. Individual Performing Services (including address if different from No. 10a)

Prefix * First Name Middle Name

* Last Name Suffix

* Street 1 Street 2

* City State Zip

11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when the transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

* Signature:

* Name: Prefix * First Name Middle Name
* Last Name Suffix

Title: Telephone No.: Date:

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PR/Award # S368A150013

NOTICE TO ALL APPLICANTS

OMB Number: 1894-0005
Expiration Date: 03/31/2017

The purpose of this enclosure is to inform you about a new provision in the Department of Education's General Education Provisions Act (GEPA) that applies to applicants for new grant awards under Department programs. This provision is Section 427 of GEPA, enacted as part of the Improving America's Schools Act of 1994 (Public Law (P.L.) 103-382).

To Whom Does This Provision Apply?

Section 427 of GEPA affects applicants for new grant awards under this program. . **ALL APPLICANTS FOR NEW AWARDS MUST INCLUDE INFORMATION IN THEIR APPLICATIONS TO ADDRESS THIS NEW PROVISION IN ORDER TO RECEIVE FUNDING UNDER THIS PROGRAM.**

(If this program is a State-formula grant program, a State needs to provide this description only for projects or activities that it carries out with funds reserved for State-level uses. In addition, local school districts or other eligible applicants that apply to the State for funding need to provide this description in their applications to the State for funding. The State would be responsible for ensuring that the school district or other local entity has submitted a sufficient section 427 statement as described below.)

What Does This Provision Require?

Section 427 requires each applicant for funds (other than an individual person) to include in its application a description of the steps the applicant proposes to take to ensure equitable access to, and participation in, its Federally-assisted program for students, teachers, and other program beneficiaries with special needs. This provision allows applicants discretion in developing the required description. The statute highlights six types of barriers that can impede equitable access or participation: gender, race, national origin, color, disability, or age. Based on local circumstances, you should determine whether these or other barriers may prevent your students, teachers, etc. from such access or participation in, the Federally-funded project or activity. The description in your application of steps to be taken to overcome these barriers need not be lengthy; you may provide a clear and succinct description of how you plan to address those barriers that are applicable to your circumstances. In addition, the information may be provided in a single narrative, or, if appropriate, may

be discussed in connection with related topics in the application.

Section 427 is not intended to duplicate the requirements of civil rights statutes, but rather to ensure that, in designing their projects, applicants for Federal funds address equity concerns that may affect the ability of certain potential beneficiaries to fully participate in the project and to achieve to high standards. Consistent with program requirements and its approved application, an applicant may use the Federal funds awarded to it to eliminate barriers it identifies.

What are Examples of How an Applicant Might Satisfy the Requirement of This Provision?

The following examples may help illustrate how an applicant may comply with Section 427.

- (1) An applicant that proposes to carry out an adult literacy project serving, among others, adults with limited English proficiency, might describe in its application how it intends to distribute a brochure about the proposed project to such potential participants in their native language.
- (2) An applicant that proposes to develop instructional materials for classroom use might describe how it will make the materials available on audio tape or in braille for students who are blind.
- (3) An applicant that proposes to carry out a model science program for secondary students and is concerned that girls may be less likely than boys to enroll in the course, might indicate how it intends to conduct "outreach" efforts to girls, to encourage their enrollment.
- (4) An applicant that proposes a project to increase school safety might describe the special efforts it will take to address concern of lesbian, gay, bisexual, and transgender students, and efforts to reach out to and involve the families of LGBT students.

We recognize that many applicants may already be implementing effective steps to ensure equity of access and participation in their grant programs, and we appreciate your cooperation in responding to the requirements of this provision.

Estimated Burden Statement for GEPA Requirements

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless such collection displays a valid OMB control number. Public reporting burden for this collection of information is estimated to average 1.5 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The obligation to respond to this collection is required to obtain or retain benefit (Public Law 103-382). Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the U.S. Department of Education, 400 Maryland Ave., SW, Washington, DC 20210-4537 or email ICDOcketMgr@ed.gov and reference the OMB Control Number. 1894-0005.

Optional - You may attach 1 file to this page.

GEPA 427 Statement.pdf	Add Attachment	Delete Attachment	View Attachment
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GEPA Statement

Kansas State Department of Education Enhanced Assessment Grant Application

Use of Learning Maps as an Organizing Structure for Formative Assessment

With respect to the requirements of General Education Provisions Act, Section 427 (GEPA), the Kansas State Department of Education (KSDE) along with project partners will take all steps necessary to ensure equitable access to and participation in the services provided through the project for **all** teachers and students. KSDE fully supports Equal Employment Opportunity and Affirmative Action principles, practices, and programs. KSDE does not discriminate among applicants or employees on the basis of race, color, religion, gender, national origin, political affiliation, marital status, veteran status, or age. Applicants or employees capable of performing the duties of a position or job classification may not be discriminated against because of a physical or mental disability.

In addition, the partner states have strong beliefs about the value of inclusion of individuals with diversity and/or special needs in their educational programs. None discriminate in hiring or employment practices or in the delivery of education or other services. In order to ensure equitable access for all participants, as required by General Education Provisions Act (GEPA), KSDE will address barriers to participation in five specific ways related to the proposed project.

Steps to Insure Equitable Access	
Step 1	Materials development: Assessment materials produced by the proposed project will target students in the general education population, with a particular focus on students who struggle to meet grade level proficiency requirements. By using learning maps as the foundation, these materials will inherently promote diverse learning needs by explicitly modeling multiple learning pathways that students can navigate to suit

	accessibility needs or disabilities. Thus the project's development efforts will deliberately address equitable access and participation by all students.
Step 2	Modifications of materials: Since the materials developed for the proposed project will be distributed to the partner states' participating teachers, local education staff will be invited to adapt materials to meet the needs of students with limited English language proficiency using interpreters to translate materials. Educators will also be provided information about how to adjust activities and assessment tasks for students with particular accessibility needs.
Step 3	Accessibility and accommodations: Every effort will be made to ensure full accessibility to meetings, training sessions, communications, and other project activities. Special accommodations for participants with all types of disabilities, whether physical mobility or sensory impairments, will be made so that educators and state personnel can fully participate. For example, face-to-face professional development will be held at venues that are fully accessible. Accommodations will be made based upon the individual needs and preferences of the participants.
Step 4	Diversity of project staff: Diverse groups of people will be involved in developing project activities and in recruitment and retention of participants in the partner states. People with minority status, whether based on gender, race, or national origin, will be encouraged to participate. Training and professional development for personnel will be available to promote sensitivity and awareness to the students with diverse learning needs and to create a supportive climate that fosters authentic engagement of participating teachers and their students.
Step 5	Recruitment of participants: Procedures will be in place to ensure equitable access to and participation by teachers from diverse groups. Teachers with minority status, whether based on gender, race, or national origin, will be encouraged to participate.

Other unforeseen barriers to full access may be identified as the project gets underway, and KSDE will address those barriers as they arise. Within contractual service agreements and agreements, KSDE requires all entities to encourage applications from underrepresented groups and identify strategies for doing so.

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

* APPLICANT'S ORGANIZATION

Kansas State Department of Education

* PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE

Prefix: * First Name: Middle Name:

* Last Name: Suffix:

* Title:

* SIGNATURE:

* DATE:

Abstract

The abstract narrative must not exceed one page and should use language that will be understood by a range of audiences. For all projects, include the project title (if applicable), goals, expected outcomes and contributions for research, policy, practice, etc. Include population to be served, as appropriate. For research applications, also include the following:

- Theoretical and conceptual background of the study (i.e., prior research that this investigation builds upon and that provides a compelling rationale for this study)
- Research issues, hypotheses and questions being addressed
- Study design including a brief description of the sample including sample size, methods, principals dependent, independent, and control variables, and the approach to data analysis.

[Note: For a non-electronic submission, include the name and address of your organization and the name, phone number and e-mail address of the contact person for this project.]

You may now Close the Form

You have attached 1 file to this page, no more files may be added. To add a different file, you must first delete the existing file.

* Attachment:

Part3 : ED Abstract Form

The *Use of Learning Maps as an Organizing Structure for Formative Assessment* project will investigate the use of organized learning models as the binding structure linking curriculum, instruction, and formative assessment. Teachers need a structure to deepen their knowledge of student learning and supporting materials to implement formative assessment in the service of advancing student learning. The proposed project will provide both an organizing structure for professional development and instructionally relevant activities and tasks to support effective formative assessment. The project will simultaneously focus on development of learning maps focused materials and implementation of these tools in our partner states.

This project will develop learning maps with descriptions explaining the nodes and connections to help teachers plan instruction that is sensitive to cognitive development. For each learning map, the project will generate an instructional activity and teacher's guide. The project will also produce performance tasks, rubrics, and objective item sets, for teachers to administer as formative assessments to generate the data they need to address individual learning needs. We propose these materials will provide teachers the knowledge and tools they need to provide effective formative assessment and advance student learning. All materials will be made available in an intuitive web-based platform where teachers will explore learning maps and select materials for use with their students.

Using an iterative, educational design research approach, the project will include teacher participants throughout the project. Teachers will receive professional development and will engage in implementation and feedback loops to inform development. During the final year of the project, up to 400 teachers will participate, providing evidence of scalability. During this final year, students in partner states will participate through their state assessment records, which will be analyzed to gauge the impact of learning maps based formative assessment on student achievement.

This project addresses the following priorities: Absolute Priority 1—Collaborations; Absolute Priority 2—Use of Multiple Measures of Student Academic Achievement; Absolute Priority 3—Charting Student Progress Over Time; Absolute Priority 4—Comprehensive Academic Assessment

Part3 : ED Abstract Form

Instruments; Competitive Preference Priority 1 a and b—Implementing Internationally Benchmarked College and Career-Ready Standards and Assessments; Competitive Preference Priority 2 a and b — Leveraging Technology To Support Instructional Practice and Professional Development; and Invitational Priority 2 a —Leveraging Technology to Support Personalized Learning and to Improve Assessment Tools.

Project outcomes will include learning maps and formative assessment tools for elementary and middle school mathematics and English language arts in addition to an open source web-hosting solution for making these available to educators. The project's study of learning maps based formative assessment development and implementation will inform the field on updated best practices for advancing student learning through formative assessment. The project's Advisory Board will include experts with the needed expertise to advise project staff on solutions having the most positive influence on teachers and student learning. McRel will conduct external formative and summative evaluation.

The number of participating teachers will increase from 50 teachers in Year 2, to 100 teachers in Year 3, and 400 teachers in Year 4. To assess the effectiveness of learning-maps based formative assessment on student achievement, the project will identify matched groups of students and apply propensity score analyses using state assessment data from 2018 and 2019 as pre- and post-tests for students taught by participating teachers in the partner states.

Development activities will take place at CETE at the University of Kansas. Implementation activities will take place in the classrooms of teachers in five partners states, namely, Alaska, Iowa, Kansas, Missouri, and Wisconsin. Training activities for years one and two will be centralized in Kansas City, MO. Training activities during year three will be dispersed, taking place at one location within each partner state.

Project Narrative File(s)

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Use of Learning Maps as an Organizing Structure for Formative Assessment

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Use of Learning Maps as an Organizing Structure for Formative Assessment

Introduction

Broadly speaking, formative assessment has failed to live up to its formidable promise (Kingston & Nash, 2011). The participating state departments of education and University of Kansas research team believe that, to a large extent, this is because there is no organizing structure that connects curriculum, instruction, and formative assessment, and thus teachers must independently determine how to best integrate multiple classroom practices. The proposed project will address the problem of advancing student achievement through defining and evaluating best practices in formative assessment. Learning maps¹ will provide the needed structure linking formative assessment processes for eliciting evidence of student thinking to teacher decision making about instruction. The proposed work will advance the theory, knowledge, and practices of using organized learning models as and in support of instructional tools by (1) creating learning-maps based, classroom-friendly suites of instructional materials that support formative assessment, (2) delivering these materials in an intuitive web-based technology environment, (3) promoting teacher learning of content and pedagogical knowledge using learning maps, and (4) advancing teachers' uses of learning maps to support their formative assessment practices.

While the materials and approaches produced by this study will be appropriate for all students, special attention will be directed (1) to the support of struggling learners and (2) to the support of teachers who wish to provide differentiated instruction as part of a program of personalized learning.

Absolute Priority 1—Collaborations.

Collaborate with institutions of higher education, other research institutions, or other organizations to improve the quality, validity, and reliability of State academic assessments beyond the requirements for such assessments described in section 1111(b)(3) of the ESEA. This project will be based on a

¹ A learning map is a network of connected learning targets, representing the many-to-many relationships among concepts and skills and containing a landscape of learning pathways that are not necessarily linear.

collaboration of the five participating state education agencies (Kansas, Alaska, Iowa, Missouri, and Wisconsin) and the University of Kansas Center for Educational Testing and Evaluation (CETE). The participating state education agencies are already involved in one or more highly collaborative projects with the University of Kansas—the DLM[®] Alternate Assessment Consortium, the Kansas Assessment Program, or the Alaska Measures of Progress—and thus there is an established track record for efficient and highly effective collaboration.

Absolute Priority 2—Use of Multiple Measures of Student Academic Achievement.

Measuring student academic achievement using multiple measures of student academic achievement from multiple sources. This project will produce and evaluate multiple forms of assessment including classroom activities, performance tasks, and sets of selected response items to promote and support better learning through the use of effective formative assessment practices by teachers and students.

Absolute Priority 3—Charting Student Progress Over Time.

Charting student progress over time. The learning map software developed for this project will allow teachers to track student performance over time against the pathways within the map, describing at any point in time what knowledge has been learned and what knowledge requires more study. This is in contrast to an accumulation scoring model that risks losing sight of particular learning needs of students.

Absolute Priority 4—Comprehensive Academic Assessment Instruments.

Evaluating student academic achievement through the development of comprehensive academic assessment instruments, such as performance- and technology-based academic assessments.

This project will produce classroom activity, performance tasks, and item sets that can be used as formative tools to elicit information about student mastery of the nodes contained in each learning map. These materials can be used flexibly by teachers and students to assess student learning and inform instructional decisions. Teachers will also receive information about how to adapt or generate their own learning-maps based assessment tools.

The project also addresses the following competitive preference priorities:

Competitive Preference Priority 1—

Implementing Internationally Benchmarked College and Career-Ready Standards and Assessments.

Projects that are designed to support the implementation of, and transition to, internationally benchmarked college and career-ready standards and assessments, including projects in one or more of the following:

- a. Developing and implementing student assessments (such as formative assessments, interim assessments, and summative assessments) or performance-based tools that are aligned with those standards, that are accessible to all students. This project will produce class-level activities and individual student-level tasks for use within formative assessment processes. The learning map basis of these materials will ensure their accessibility by students at different points in their learning, and teacher notes for the materials will describe accommodations for students with particular accessibility needs.*
- b. Developing and implementing strategies that use the standards and information from assessments to inform classroom practices that meet the needs of all students. This project will provide learning maps for internationally benchmarked college and career-ready standards (including the CCSS and state specific equivalent standards). This project will introduce learning maps as organizing structures for instructional tools that can be used to assist teachers as they determine learning goals, identify component concepts and skills (i.e., learning map nodes), develop instruction, and interpret evidence of student thinking in terms of the learning maps. Furthermore, by providing learning-maps based assessment tools for classes and individual students, this project will help teachers collect evidence of student learning in terms of the nodes and connections in the learning map, thereby tying student data directly back to their learning goals as shown in the learning maps.*

Competitive Preference Priority 2—

Leveraging Technology to Support Instructional Practice and Professional Development.

Projects that are designed to leverage technology through one or more of the following:

- a. *Implementing high-quality accessible digital tools, assessments, and materials that are aligned with rigorous college- and career-ready standards.* This project will provide an intuitive interface for teachers to access and tag materials to research-based learning maps, professional development modules, instructional materials, and assessments aligned to selected rigorous college- and career-ready standards.
- b. *Using data platforms that enable the development, visualization, and rapid analysis of data to inform and improve learning outcomes, while also protecting privacy in accordance with applicable laws.* This project will produce an online tool for viewing learning maps for individuals or groups of students. The tool will include components for entering assessment results, which will be used by the system to generate learning map visualizations to provide data-based indications of node mastery, providing teachers and students the information they need to improve learning outcomes. The system will include measures to protect the privacy of student and teacher data in accordance with applicable laws and policies.

This project will also address one invitational priority.

Invitational Priority 2—

Leveraging Technology to Support Personalized Learning and to Improve Assessment Tools. Projects that focus on leveraging technology to:

- a. *Support personalized learning, including diagnostic, formative, interim, and summative assessments that can inform instruction.* This project will provide teachers and students with online tools deliberately designed to support and inform personalized learning. The learning maps exist in an online database with web-based user interface that can host attached materials such as instructional videos, lesson plans, activities, and assessments. This project will specifically produce materials designed for teachers and students to use within formative assessment processes; for a breadth of academic standards, this project will provide learning maps,

professional development modules, classroom activities with instructional notes, and individual student assessments with rubrics that tie student responses to the learning maps.

Need for Project

Teachers need a structure to deepen their knowledge of student learning and supporting materials to implement formative assessment in the service of advancing student learning. The proposed project will provide both an organizing structure for professional development and instructionally relevant activities and tasks to support effective formative assessment. The next sections describe the need for this project in terms of the severity of the problem, the need for this work, and the gap that will be addressed by the proposed materials development and implementation.

Magnitude or Severity of the Problem

The proposed project will address the problem of advancing student achievement through use of learning maps as an organizing structure for professional development and tools that can be used for formative assessment. By using learning maps to address gaps in understanding, teachers will be better able to help students reach their learning targets. Teachers will be in a better position to personalize learning by providing activities that will be appropriate for students at different points in learning pathways.

Educators face two challenges in providing this type of instruction: limitations in their knowledge of how learning develops in a content domain, and difficulties in identifying where students are in their learning. Organized learning models such as learning progressions, learning trajectories, and learning maps describe how learning unfolds and can serve as effective inputs to formative assessment processes for eliciting evidence of student thinking and moving students forward in their learning. Teachers need content-specific professional development opportunities and effective, easy-to-use instructional materials to improve their understanding of how students learn. Teachers also need to implement instruction that includes cycles of assessing student understanding and using evidence to inform instructional decisions.

Magnitude of the Need for the Proposed Work to be Conducted

Teachers need tools to help them understand the breadth of learning needs their students may have and to direct learning toward the targets described by internationally benchmarked college- and career-ready standards. The content expectations for elementary and middle mathematics and English language arts span a vast array of concepts and skills, particularly when they are examined in sufficiently granular detail to serve the needs of personalized instruction. This instruction is specific to the needs of an individual student, is informed by the student's mastery status within the nodes of a learning map, and addresses gaps in understanding to prepare students to reach learning targets. Fine-grained learning maps for each academic standard can provide teachers with the detailed information they need to consider different learning pathways and plan instruction that can flexibly respond to students' needs. Development of fine-grained learning maps is labor intensive and beyond the capabilities of an individual teacher. The Dynamic Learning Maps® project required the effort of about ten researchers and research assistants over the course of four years to build the English language arts and mathematics portions of the map out to address the assessment needs of students with significant cognitive disabilities. The mathematics part of the learning map was extended in another project, "Development of a learning map prototype complete with enhanced learning progressions and visualizations," and this project will require additional work to refine and build out the starting maps (English Language Arts and Mathematics) to meet the needs of all students in grades 2-8.

This project will produce learning maps for individual standards and coherent groups of standard to help teachers plan instruction that is sensitive to cognitive development. These learning maps will be accompanied by written and videotaped descriptions explaining the nodes and connections in each map. For each learning map, we will generate an instructional activity and teacher's guide, providing a sample of how to draw out knowledge and target the nodes in the learning map. We also will develop performance tasks and rubrics, as well as objective item sets, for teachers to administer as formative assessments to generate the individual student data they need to address student's individual learning

needs. The rubrics and answer keys for these formative assessments will be accompanied by notes about how to interpret student responses in terms of the nodes and connections in the learning map.

The Gap that the Proposed Work will Address

Teachers need support to deliberately link theories of learning depicted in organized learning models (such as learning maps) to effective formative assessment strategies and outcomes. In particular, teachers need tools to help them interpret student work products and statements in terms that describe where students are in the learning and what they need to learn next. This project will respond to a current call for modular instructional resources focused on specific learning goals (Molnar, 2015) by producing learning-maps based professional development and formative assessment materials for elementary and middle school mathematics and English language arts. Project activities will include an examination of this academic content to identify learning maps that model student learning of single standards or small clusters of standards. For each learning map, the project will also produce professional development explaining the learning theories with instructional activities and formative assessment tasks that address the knowledge depicted in the learning map. All materials will be delivered in an easily navigable online interface where teachers can explore the learning map more broadly and can select resources to use within their instruction. Finally, the project will assess the effect of learning-maps based formative assessment on student achievement.

Significance

Significance of the Problem

For over five decades, US policy makers have expressed concern over the status of educational programs, asserting that student academic achievement is the key to maintaining our national security and competitiveness in the global economy. In response to this concern, several educational reform efforts and accountability systems have been implemented, ranging from programs focused on basic skills to programs emphasizing the main ideas within the academic disciplines (Hanushek, Peterson, & Woessmann, 2012). Nevertheless, student achievement in the US has not changed significantly while

students in many other countries surpass them on international assessments and attaining college degrees (Bill & Melinda Gates Foundation [BMGF], 2010).

Teachers and students need a map to locate where they are and find the paths to where they need to go. Teachers must formatively assess student readiness in precursor skills and identify optimal learning pathways. For example, when planning a trip across the country, a traveler needs to know what routes exist, not just the direction they go in. It is important for a traveler to know how direct the routes are, how scenic, and how fast they can be traveled on. Information shown on a map allows a traveler to determine a path suited to his personalized needs.

Similarly, a learning map can help teachers implement personalized instruction by identifying where students are in their learning and what they should and can learn next. Evidence suggests that personalized instruction can powerfully improve learning by deliberately identifying students' existing knowledge and building on it to move students toward particular learning targets (Bransford, Brown, & Cocking, 2000; Enyedy, 2014; BMGF, 2010). Conversely, personalized instructional programs focusing primarily on student preferences and choices do not produce changes in learning outcomes. Teachers need tools that can help them personalize education.

Personalized instruction requires the emphasis within a classroom to shift from a teaching paradigm to a learning paradigm (Bransford, Brown, & Cocking, 2000), focusing on students' individual achievement of the established learning goals (Keefe & Jenkins, 2008). In this type of environment, teachers not only must provide direct instruction, guided practice, and assessment opportunities, but they also need to give students task-specific feedback to assist them in filling gaps in their knowledge and moving toward their learning goals. Yet, conducting informal assessments, such as observing students during class and looking at student work products, are by themselves inadequate. Teachers and students need tools that translate student assessment responses into information that describes what students know what they still need to learn. Imagine a child in the back seat of the traveling car asking, "Are we there yet?" To answer this question, the driver must know where they are in relation to the destination and the route they are driving. Similarly, teachers and students could use a learning map to identify the learning

goal, route, and intermediate steps. As the intermediate steps are assessed, they can determine whether and how to move forward, and whether they are “there yet.”

Potential of the Proposed Project to Advance the Theory, Knowledge, and Practices in Formative Assessment that Facilitates Personalized Learning

The proposed work will advance the theory, knowledge, and practices of using organized learning models as instructional tools by (1) creating and validating learning maps and providing and evaluating classroom-friendly suites of instructional materials that support formative assessment, (2) delivering these materials in an intuitive web-based technology environment for hosting learning map visualizations with attached materials, (3) promoting teacher learning of content and pedagogical knowledge using learning maps, and (4) advancing teachers’ uses of learning maps to support their formative assessment practices. Unique to this project is the central and powerful position of learning maps to inform professional learning, design instructional activities, and develop assessment tasks, which in turn will support direct links between assessment responses the learning maps. The project also provides teachers the basis for the descriptive feedback students need to understand and close gaps in their learning.

Despite calls for personalizing instruction in schools (e.g., differentiated instruction, response to intervention, multi-tiered systems of support), little effort has focused on creating comprehensive systems to support this type of teaching and learning in advance of students failing, falling behind, or otherwise experiencing learning problems. Whereas learning progressions have been promoted as useful instructional models that underlie popular academic standard (e.g., Common Core State Standards, Next Generation Science Standards), researchers have identified difficulties teachers have in using learning progression with assessment data to productively inform instructional decisions (Alonzo, de los Santos, & Kobrin, 2014; Furtak, 2012; Furtak, Morrison, & Kroog, 2014). One focus of the proposed project is to prepare materials that make explicit the connections between student responses to formative assessment tasks and their meaning in terms of information depicted in learning maps, thereby providing the needed scaffolds for teachers to interpret student work in terms of where a student is within a learning

progression. We believe that this scaffold is the key to advancing teachers' capacity to use assessment information with an organized learning model to inform their instruction.

Potential to Generalize Findings from the Proposed Project

Later in this proposal we will identify specific research questions around the use of learning maps to link formative assessment and instruction. Materials will be developed and organized within the learning map to allow teachers to implement best practices that we identify. Both the potential to generalize findings from the proposed project and the expected broad use of the materials that will be developed will be strengthened by our collaboration with five member states, the inclusion of large numbers of diverse teachers within the research and development process, and the availability of materials via an intuitive web-based interface.

Our collaboration with five member states will ensure that we create products that are accessible for use by a broad set of teachers serving various communities with different demographic characteristics. In addition, our project will focus on a broad range of academic content standards by preparing instructional materials relevant to the mathematics and English language arts standards for elementary and middle grades (i.e., grades 2-8). Our learning-maps based professional development and instructional modules will be aligned and tagged for use in the different partner states by encoding each state's standards (CCSS or the equivalent) directly in the learning-map database. Not only will this technique address our particular partners' needs, but our technical solution will pave the way for aligning the products developed in the proposed project to any content standards by making the learning map central to the association of academic standards and instructional resources.

This project will produce professional development modules and instructional resources to support teachers in conducting learning-maps based instruction and formative assessment. During the course of the project, our design will rely heavily on participating teachers in our partner states, who will pilot test and provide feedback on each resource, as well as the interface through which they are made available. Our inclusion of teachers within the research and development process will serve two major aims: (1) iterative refinements to the materials developed for teachers and their accessibility via and

intuitive interface, and (2) grassroots adoption of learning maps as instructional tools. That is, by scaling up teacher participation during each funded year through a mentoring program, we anticipate participating teachers in the final year to model and attract widespread use of these materials in years after the project is completed. Furthermore, after the project period ends, we intend to release the products developed herein for the common good through open source licensing of the software and free availability of the professional development and instructional resources for non-commercial uses.

Develop New Strategies that Build On and Provide Alternatives to Existing Strategies

This project will build on uses of organized learning models to inform professional development (e.g., Sztajn, Confrey, Wilson, & Edgington, 2012), instruction (e.g., Heritage, 2008), and test development (e.g., Mislavy & Haertel, 2006). The partner states will collaborate with the Center for Educational Testing and Evaluation (CETE), housed within the Achievement and Assessment Institute, a designated research center at the University of Kansas, to take advantage of its rich history in collaborating on projects related to excellence in teaching and assessment. In particular, CETE has expertise in developing learning maps; generating learning maps based assessments; designing secure, intuitive software solutions for visualizing learning maps; and creating instructional materials associated with learning maps (Dynamic Learning Maps, 2010; <http://dynamiclearningmaps.org>; Kingston, Broaddus, & Pardos, 2014). Researchers in CETE have also conducted exploratory studies investigating how teachers can and prefer to use learning maps information to study the content they teach, plan instruction, and interpret student work products (Broaddus & Sharma, 2015). Findings from these recent investigations are consistent with conclusions described by Furtak, Morrison, and Kroog (2014), suggesting that although organized learning models provide teachers valuable insights to how students learn, teachers need additional scaffolds to carry out instruction and assessment activities that cultivate the learning and development described in the learning models. One teacher shared this reflection about her use of a learning map to plan instruction focused on multiplying fractions.

Before we saw the learning map, we taught students the standard algorithm and thought that was enough. After considering the learning map and improving our own understanding of how area

models represented what was really happening when we multiplied fractions, we changed our instruction. We used the area model earlier in our teaching and found that our students were then better able to understand to the standard algorithm, either arriving at it on their own or through guided conversations. We also noted how our struggling students in particular appeared to hang on to their understanding better than when we focused on the procedure instead of the concepts.

(N. Lindner, personal communication, June 3, 2015)

The proposed work will produce learning maps as professional development resources, learning maps based instructional materials designed to elicit evidence of student thinking and promote opportunities for formative assessment, and tools that make explicit the links between student responses and valid interpretations in terms of information depicted in the learning maps. By building on previous work that has explored uses of organized learning models to inform different aspects of education, this project will place learning maps at the center of a coordinated suite of materials to enhance teacher understanding of how students learn particular content while providing the necessary scaffolds for implementing instruction and formative assessment consistent with the learning theory depicted in the learning maps. We propose that this strategy will provide the needed tools to overcome documented difficulties teachers have in using learning progressions with assessment data to inform their instructional decisions and improve the achievement of students who persistently struggle to achieve grade level proficiency (Alonzo, de los Santos, & Kobrin, 2014; Furtak, 2012; Furtak, Morrison, & Kroog, 2014).

Utility of Products from the Proposed Project for Use in a Variety of Other Settings

(Dissemination of materials)

There are four separate categories of products that will be produced in this project. They are listed here in the order of their necessity for our development processes.

- Open-source learning map visualization software (enhancement of existing open source software) that allows a user to view and explore learning maps to develop awareness of how learning unfolds within a domain

- English language arts and mathematics learning maps covering grades 2-8 (royalty free license for non-commercial purposes)
- Research findings related to this project
 - Best practices in visualizing learning maps and using them as an organizing principal for instructional and assessment materials
 - Best practices in using learning maps for classroom instruction including formative assessment
 - Best practices in using learning maps to deepen content and pedagogical knowledge for teaching
- Materials for teachers (all tied to nodes on the learning map)
 - Professional development materials
 - Classroom activities that provide formative feedback
 - Performance tasks
 - Selected-choice formative assessment item sets

The products developed within the proposed project will be developed using an iterative design approach with the help of a diverse cadre of participating teachers during the first three years of the project, and will be evaluated for efficacy during the fourth year of the project. This will ensure utility for wide-scale, non-commercial use immediately following the funded period. Because the learning maps model shows how learning unfolds for any student, allowing for multiple pathways when they exist, and the resources developed within this project will be designed to reflect the learning theories described in the learning maps, the partner states anticipate that this project will yield products of tremendous value to the broad audience of elementary and middle grades teachers and students across the United States.

The potential uses of the learning map and associated resources to influence personalized instruction and improved learning are flexible and powerful. This project could productively inform and support strategies such as flipped classrooms and independent online learning. We anticipate learning maps can help parents and students increase their understanding of learning goals and progress toward

them, particularly when educators conference with students and parents to plan strategies for creating personalized learning options that maintain focus on internationally benchmarked academic standards.

Project Design

Goals, Objectives, and Outcomes (are clearly specified and measurable)

The goal of the proposed project is to improve teachers' ability to provide personalized instruction by supplying them with the tools they need to implement effective formative assessment practices. The project will leverage the use of learning maps as the basis for professional development and instructional materials designed to promote the conditions implementing formative assessment practices, namely, establishing learning goals associated with internationally benchmarked academic standards, engaging students in activities that prompt meaningful learning, eliciting evidence of student thinking, interpreting that evidence in terms of learning goals, providing task focused feedback, and adjusting next instructional steps to address student learning needs and assist students in closing any gaps between their current knowledge states and their learning goals.

Using college- and career-ready standards as a guiding framework, the project will produce the following four types of materials for elementary and middle grades English language arts and mathematics (grades 2-8):

1. **Learning maps** for selected academic standards and supporting prerequisite nodes made available for teachers to explore in web-based visualization software. Videotaped descriptions of each learning map will be provided to support independent or group level professional learning opportunities.
2. **Classroom activities** that highlight the nodes in a particular learning map with accompanying documentation containing effective questions for eliciting student thinking as well as instructional guides containing descriptions of common misconceptions or errors and their links to the learning map. These activities will promote the conditions for conducting formative assessment and personalized instruction—eliciting evidence of student thinking through productive discussions,

activities, or tasks, interpreting student work and statements, and adjusting next instructional steps in response to students' needs. The development process will yield videotapes of teachers enacting selected activities, which will become part of the library of materials shared with teachers in partner states.

3. **Performance tasks** that assess student learning of the nodes in a particular learning map and generate the data teachers need to inform adjustments in their instruction. Intended for individual students, these materials will be accompanied by scoring rubrics and other materials that will intentionally link anticipated student responses to their meaning in terms of the learning map nodes and connections, thereby helping teachers to reflect on formative assessment data in terms of where their students are in their learning and to plan for individualized instruction.
4. **Objective item sets** that assess student understanding of the topic(s) modeled in a particular learning map. Intended for individual students and objective scoring methods, these materials will provide teachers with the option of administering pre- and post-tests for one or more standards.

Conceptual Framework

This project aims to promote and support teachers in implementing personalized instruction by focusing on formative assessment practices and materials. The major themes defining the conceptual framework include personalized instruction, formative assessment, and organized learning models. The framework also highlights points where these overarching concepts intersect, such as professional development activities promoting teachers' use of organized learning models within formative assessment, or research findings documenting teachers' needs for implementing formative assessments that make productive use of organized learning models.

Personalized instruction. Personalized instruction can improve learning by identifying students' existing knowledge as a source upon which to build new knowledge and move students toward particular learning targets (BMGF, 2010; Bransford, Brown, & Cocking, 2000; Enyedy, 2014). Teachers who shift their attention from their own teaching behaviors to gathering evidence of student learning position themselves to provide the type of personalized instruction that focuses on students' individual

achievement of the established learning goals (Keefe & Jenkins, 2008). In this type of environment, teachers not only must provide direct instruction, guided practice, and assessment opportunities, but they also need to give students task-specific feedback to assist them in filling gaps in their knowledge and adjust next instructional steps to keep students moving toward their learning goals.

Computer-delivered personalized instruction programs have gained popularity and have been studied primarily at the post-secondary level (Enyedy, 2014). Both adaptive learning systems and intelligent tutoring systems employ embedded assessments to collect information about the learner and determine what training or assessments to deliver based on student responses to previous system tasks. However, these systems typically address primarily procedural tasks and have limited effectiveness for addressing the deep conceptual understanding needed for proficiency within a content domain. Furthermore, for students to make actual gains, any system employing assessment to advance learning must provide performance based, task-specific feedback to help learners understand and close their learning gaps. This requirement is difficult for any system to fill because of the highly sophisticated artificial intelligence structure that would be needed. However, learning maps contain the necessary framework to provide teachers with the performance based, task-specific feedback to guide personalized instruction.

Blended learning models have also received increased attention in recent years, particularly in light of the movement to “flip classrooms,” where students watch instructional videos outside of school and practice skills during class where their teachers can circulate, observe, and provide needed assistance (Enyedy, 2014). Whereas purely online personalized instructional models have not shown significant increases in learning, blended learning models have shown modest increases depending on the context. Studies investigating the effects of blending traditional instructional methods with online tutoring and feedback programs suggest that different kinds of traditional instruction yield different overall results.

In addition to the high cost of acquiring adequate technology for implementing blended instructional models, another obstacle districts face is helping teachers to effectively use the amount and type of data provided from the computer-delivered instruction component (Enyedy, 2014). Organized learning models

are needed to link instructional materials to student responses. Learning maps can provide this organization. Teachers are able to interpret student responses and receive guidance in developing personalized instruction.

Teachers generally believe every student deserves to receive instructional support, and this instruction should be tailored according to each student's strengths and needs. The results of a recent representative survey of over 4,600 teachers indicated that 86% of the teachers surveyed constantly seek ways of engaging students according to their ability level, while 78% of the teachers believe that data can help them identify where each student currently stands in regards to a specific topic and where they can go in their development. Despite the importance of having an accurate picture of student understanding to develop effective instruction, most teachers today do not feel they have access to the data and effective tools to apply that data in their daily teaching. The same survey found that 67% of teachers are not satisfied with the current state of the data and tools at their disposal (BMGF & Boston Consulting Group [BCG], 2014). These findings suggest that if adequate data and tools were made available to teachers, they would be used to develop personalized instruction for their students, which points to the question of what supports teachers need to provide effective personalized instruction in any format.

To implement personalized instruction, teachers require data and supporting tools that are efficient and practical and that would eliminate the cumbersome manual data compilation process currently in place at most schools (BMGF & BCG, 2014). Teachers would like a tool that addresses the three components of personalized instruction: assessing data, analyzing data, and guiding instruction. They want a tool that simplifies the data preparation process yet represents each student holistically. Teachers would also prefer a tool that portrays timely information about student progress on the various skills and indicates where the student stands regarding the CCSS. Lastly, the tool should be flexible enough to adapt to a student's current skill level, should guide instruction tailored to meet the student's needs, and be able to help predict student growth and potential problem areas.

Formative assessment. Researchers have noted that implementation of formative assessments can positively impact student achievement, producing effect sizes as high as 0.7 (e.g., Black & Wiliam,

1998). Kingston and Nash (2011), however, using a random effects meta-analysis, found an overall weighted mean effect size of 0.20, although there were differences associated with the approach taken to implement a formative assessment (with professional development approaches providing a weighted mean effect size of .30). In a related research literature synthesis, Hattie and Timperley (2007) described highly effective feedback for students as that which answers three questions: *Where am I going? How am I going? Where to next?* We propose learning maps as tools for helping teachers to address these three questions related to formative assessment, effective feedback, and improved student learning. Teachers and students can use learning maps to specify learning goals (*Where am I going?*), understand the component skills and steps students need to navigate to achieve those goals (*How am I going?*), and consider next steps in learning as students make progress toward those goals (*Where to next?*).

Teachers who aim to implement personalized instruction need to conduct activities that are identified as essential features of formative assessment, a classroom process involving students and teachers focusing on student achievement of established learning goals (Heritage, 2010). Black and Wiliam (2009) describe teachers and students engaging in formative assessment by iteratively evaluating learning as they collect and analyze evidence in the forms of conversations, observations, or student work and then use the results to modify classroom activities to enhance student achievement. Essential factors that contribute to an effective formative assessment process include clearly defined learning goals that are shared by all stakeholders, flexible instructional plans that permit teachers to revisit topics their students struggle to learn, carefully designed opportunities for students to demonstrate their knowledge, and non-threatening feedback aimed at helping students understand how to bridge the gaps between their current performance and their learning goals (Black & Wiliam, 2009; Heritage, 2010).

In an effort to describe formative assessment practices in concrete terms for teachers, Heritage (2010) created a model that mapped out critical inputs and components of the process, while also indicating where iterative cycles may be needed to adjust learning to meet students' needs. This model includes three major components: establishing learning goals and success criteria, providing iterations of constructive feedback, and closing learning gaps. Each of these major components is described below.

Teachers and students must establish clear learning goals and define criteria for successful achievement of those goals (Heritage, 2010). Although standards documents are intended to drive such goal setting, these documents often do not indicate how learning progresses over time, education, and experience may lack sufficient details for determining intermediate steps on the paths to larger curricular aims (i.e., learning goals) or describing mastery (i.e., criteria for success) (Black, Wilson, & Yao, 2011; Heritage, 2010). Organized learning models can provide the details teachers need to understand how learning unfolds within a particular domain (Black, Wilson, & Yao, 2011).

Once learning goals are established, and teachers and students all understand the criteria for success, learning activities must take place to create the conditions for loops of feedback that move students forward in their learning (Heritage, 2010). Instruction should introduce students to new material in ways that elicit evidence of student learning so that teachers can interpret that evidence to identify any learning gaps. Then teachers need to provide feedback that is task specific and helps students address the differences between their current performance and the established criteria for success (Hattie & Timperley, 2007; Heritage, 2010). Lastly, teachers must adapt follow-up instruction to provide the scaffolds students need to connect new knowledge to prior understandings, all the while working within students' zones of proximal development (Vygotsky, 1978).

The final major aim of the formative assessment process is to close the learning gap between each student's learning state and where that student needs to be to achieve the learning goal (Heritage, 2010). As students achieve one learning goal, the process begins again with teachers and students selecting a subsequent goal.

In describing shifts in classroom cultures and expectations that support formative assessment processes, Heritage (2010) provides suggestions about the knowledge and skills teachers need. Of critical importance is teachers' ability to provide the feedback and scaffolds students need to advance in their learning. This requires teachers to deeply understand the content they are teaching (i.e., content knowledge), the component concepts and skills that support meaningful learning (i.e., knowledge of metacognition), and instructional experiences that engage students in thoughtful activities related to those

concepts and skills (i.e., pedagogical content knowledge). Yet evidence suggests that some teachers may not have sufficient knowledge and might benefit from professional development to improve their teaching and instructional tools designed to deepen these types of knowledge (Conference Board of the Mathematical Sciences, 2010; Podhajski, Mather, Nathan, & Simmons, 2009).

Organized learning models. One important goal of the formative assessment process is to elicit evidence of how students have organized their knowledge so that teachers can effectively help students gain complete understanding of the content under consideration (Cizek, 2007). Whereas teachers can apply their content and pedagogical knowledge to the task of evaluating evidence of student thinking, one tool that can also support this task is an organized learning model that makes explicit the components of a content domain and how they are interrelated in the mind of an expert.

Different organized learning models are available to depict how understanding of a particular body of knowledge develops over time and experience (Gierl, Wang, & Zhou, 2008). Concept maps (Baroody & Bartels, 2001), learning hierarchies (Gagné, 1968), construct maps (Wilson, 1992, 2009), and learning progressions (e.g., Popham, 2008, 2011) are models that define what students must learn and each can be used to map out optimal learning sequences (Wilson, 2009). In mathematics education, learning trajectories have been used by teachers to plan instruction that is sensitive to student development (Clements & Sarama, 2004; Sztajn, Confrey, Wilson, & Edgington, 2012). A learning map is another cognitive model that provides a graphical representation of learning targets and the connections among them. The connections in a learning map suggest sequences in which learning may occur while modeling the possibility that not everyone learns things in the same manner or sequence (Dynamic Learning Maps Alternate Assessment System Consortium [DLM], 2010; <http://dynamiclearningmaps.org>).

Learning maps. A learning map is a network of connected learning targets, representing the many-to-many relationships among concepts and skills and containing a landscape of learning progressions that are not necessarily linear. A learning map delineates alternate pathways in reaching a goal, creating various alternate learning progressions (Tatsuoka, 2009). A learning map can also make

visible to teachers the component skills and connections that constitute robust understanding of a particular learning target or academic standard.

The DLM Alternate Assessment Consortium (2010; <http://dynamiclearningmaps.org>) developed a learning map designed to meet the specific needs of students with significant cognitive disabilities, who often have a one or more disabilities that significantly impact their intellectual functioning and adaptive behavior. In the process of developing a learning map to represent content learning between birth and college, the CCSS were adapted to reflect what students in this population could perform on the skill at each grade level. The adapted standards and supporting nodes were then modeled in the learning map as individual nodes. To be inclusive for every student in this population, the learning map represents all possible connections between the adapted academic standards and supporting skills. The resulting learning map allows users to track the learning of any student of any ability level from birth to high school graduation.

Figures 1 and 2 show two different views from the learning map of nodes that pertain to using linear functions to model real world problems. Figure 1 shows the five focal nodes that students must master for this standard. Figure 2 shows a more granular view depicting 20 nodes that support learning through prerequisite relationships to the five focal nodes. Figure 2 in particular depicts multiple pathways to the focal nodes, providing a graphical display of how a student who has mastered more precursor skills has a higher probability of mastering the focal skills.

Figure 1. Learning Map of Focal Nodes for Modeling with Linear Functions

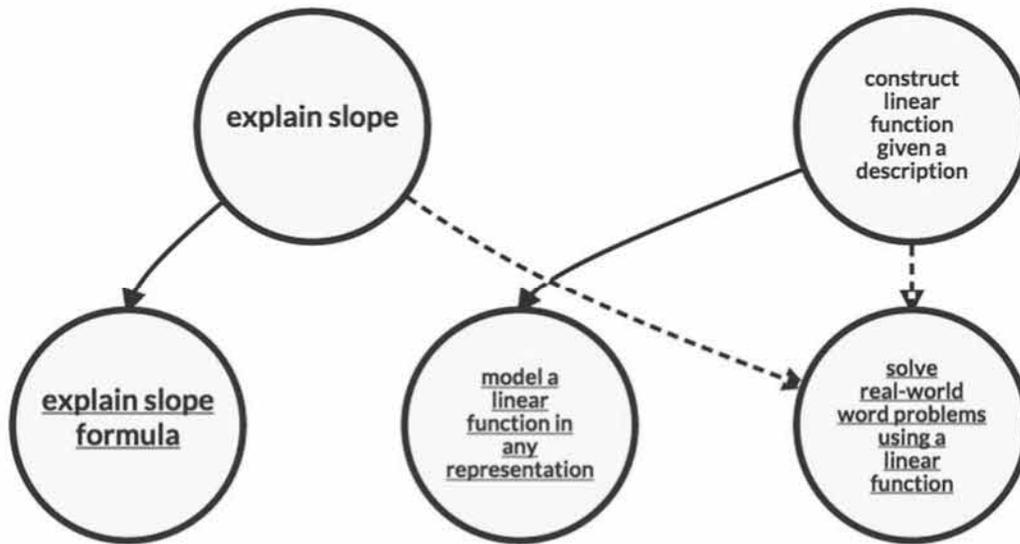
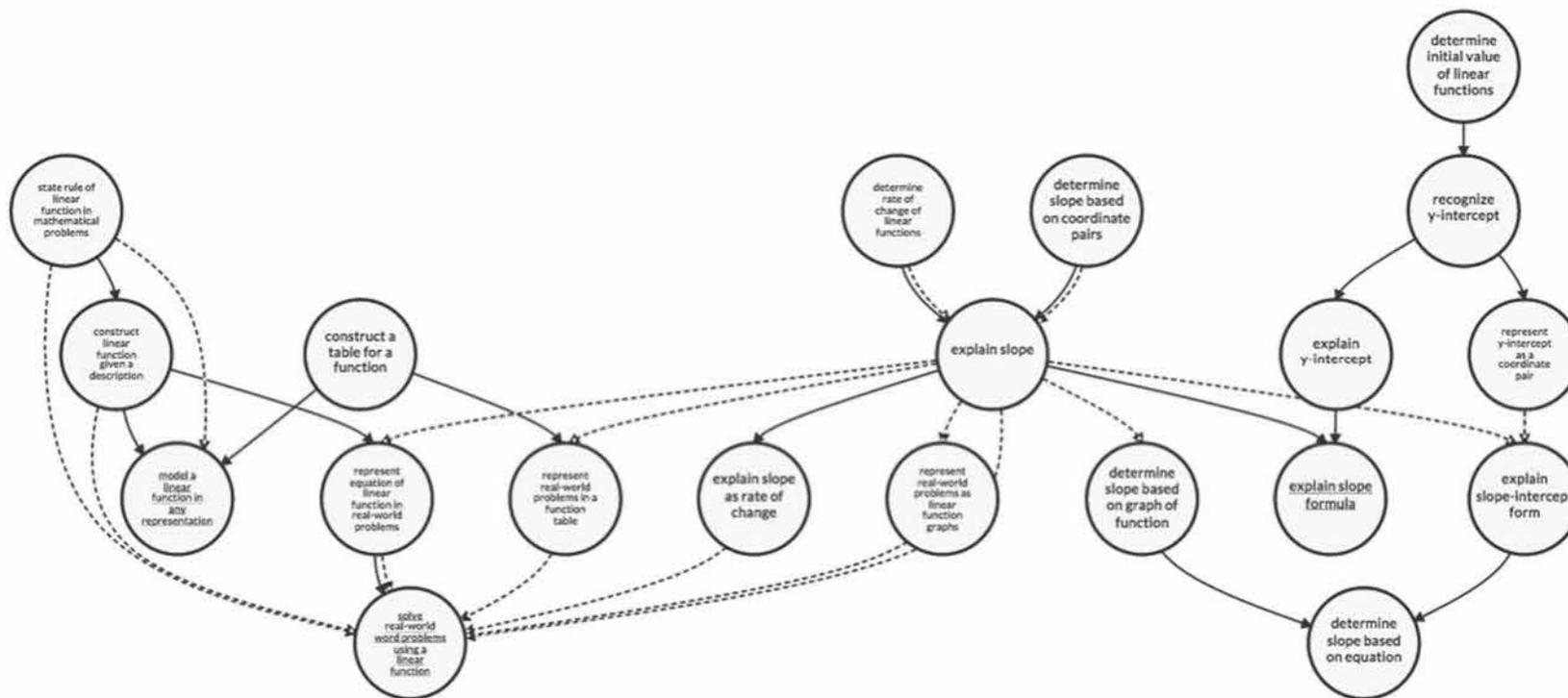


Figure 2. Learning Map Depicting Detailed View of Nodes for Modeling with Linear Functions



Using the learning map as a basis, an alternate assessment targeting the academic standards was created for students with significant cognitive disabilities (DLM, 2010; <http://dynamiclearningmaps.org>). To inform the design of the assessment, the nodes directly representing the academic standards were identified in the learning map along with several nodes that could support personalized learning progressions towards the standard nodes. The critical prerequisite nodes from this group of supporting nodes were then marked as candidates for checking intermediate steps toward mastery of the standards. Items specifications were developed at the node level for the critical prerequisite and academic standard nodes. The node details and relationships between the identified nodes informed item development by informing the creation of meaningful distractors (i.e., incorrect response options) for multiple-choice test questions. Multiple items were developed to test each of the identified nodes, and groups of items targeting the academic standard and its prerequisites were packaged and administered. Item responses provided data about where students were in their progress towards standard mastery, setting the conditions for creating personalized instruction to help students progress towards standard mastery if they had not yet mastered a prerequisite skill.

Professional development. Heritage (2008) asserted that we need to invest in teachers by providing them professional learning opportunities to help them develop their skills in assessing student learning using structures and resources in order to support formative assessment processes. When acknowledging contemporary demands for students to be college and career ready by the end of high school, Braun (2011) also recommended substantial investments targeting the professional development of teachers to improve their content and pedagogical knowledge, classroom assessment strategies, and interpretations of student work to drive instructional decisions.

Teachers require professional development and tools to collect and analyze the data that supports implementing personalized instruction, yet the Bill & Melinda Gates Foundation and the Boston Consulting Group (2014) found that a teachers perceived most professional development as irrelevant, ineffective, and disconnected from the goal of maximizing student learning. This study also identified features of professional development that promoted substantial teacher learning. Cross-cutting themes

included demands for professional development to be “relevant, hands-on, and sustained over time” (BMGF & BCG, 2014, p. 16). Only 29% of the teachers were very satisfied with their professional development support, while most of them did not believe it met their needs. Teachers generally were disappointed by the professional development provided to them, indicating that they found demonstrations and modeling of excellent teaching practices more beneficial than presentations or lectures. Yet the latter two formats dominated among professional development offerings (BMGF & BCG, 2014).

According to the Bill & Melinda Gates Foundation and the Boston Consulting Group (2014), teachers seek professional development that is relevant in multiple contexts, interactive, continuous, and teacher-driven. Coaching and collaboration were considered promising formats, particularly when the focus was on strategies for improving student learning that could be immediately used in the classroom rather than enforcing or discussing local policies (BMGF & BCG, 2014). Data analysis was also identified as a topic where professional development was needed to help teachers in making inferences from data to inform their instructional decisions (BMGF & BCG, 2014), a key skill for conducting effective formative assessment (Heritage, 2010). In summary, teachers believe professional development, which is contextually relevant for multiple topics, contains multiple active learning sessions throughout the year, and provides information on decision making using student data would provide them with the necessary tools to individualize instruction.

To help teachers have the capacity to instruct their students adequately, professional development should provide teachers with a solid theoretical and empirical background in the content areas (Brady & Moats, 1997). This background should emphasize the knowledge structure of the content, which would help teachers apply their knowledge in the classroom by making their instruction more explicit and reflective of skill development (McCutchen et al., 2002; Podhajski et al., 2009). Content-focused, coherent professional development is more likely to increase the instructional methods of teachers (Birman, Desimone, Porter, & Garet, 2000) and produce quicker student learning (Hatcher, Hulme, &

Snowling, 2004; Podhajski et al., 2009; Snow, Griffin, & Burns, 2005) than professional development activities that are not content-focused or are fragmented.

Besides being content-oriented, professional development must also be goal-oriented and long-term to be effective (Birman et al., 2000; Garet, Porter, Desimone, Birman, & Yoon, 2001; Guskey & Yoon, 2009). Long-term activities contain more active learning opportunities and are more goal-oriented than are short-term activities, such as workshops (Birman et al., 2000). These activities allow teachers to discuss their content learning, instructional methods, and common problems. Teachers can also exchange ideas on the best instructional methods for various types of students and situations on a continual basis with teachers who share similar experiences and goals (Ball, 1996; Birman et al., 2000). An example of effective long-term professional development is mentoring. Mentors promote instructional flexibility by helping teachers develop new instructional methods and activities, provide feedback on why some strategies work and others do not, and give the teachers confidence in their instruction (Birman et al., 2000; Podhajski et al., 2009). Following a two-week workshop and a year-long mentorship, teachers were more likely to alter their instructional style to make it more explicit than were teachers in the control group who did not participate, and their students achieved greater academic success than did students in the control group (McCutchen et al., 2002).

Lastly, an important aspect of professional development should be to instruct teachers in using student data when making instructional decisions. Upon completion of professional development, teachers should be able to collect relevant student data, analyze it, and use it to plan individualized instruction for different types of students (Podhajski et al., 2009). Professional development produces better results when teachers are able to adapt instructional materials to novel contents, processes, and contexts following training (van Driel & Berry, 2012). An important component of professional development that promotes individualized instruction is the focus on helping teachers to understand how they teach, what they teach, and how students learn (Guskey & Yoon, 2009).

In an effort to provide structure to the field of research on professional development for teachers, Borko (2004) identified three learning goals for improving teachers' content and pedagogical knowledge

and instructional practices. Teachers need opportunities to (1) develop deep, rich, and flexible content knowledge; (2) understand how ideas develop in to richly connected networks of knowledge within a domain; and (3) apply these two types knowledge to plan and implement effective instruction. It is important to acknowledge differences among teachers and how quickly they learn or adapt their teaching. Borko suggested that teachers have less difficulty applying their content and pedagogical knowledge to elicit evidence of student thinking than to adjust their instruction in response to that evidence, which is a critical practice needed for effective formative assessment (Heritage, 2010).

Instructional supports for formative assessment. Black, Wilson, & Yao (2011) stressed that educational programs should be focused on research-based learning theories as tools for organizing and aligning curriculum, instruction, and assessment. They argued that teachers need these theories transformed into road maps (e.g., learning maps) that make explicit the fine-grained learning targets and connections that constitute understanding of larger learning goals to drive instruction, assessment, and interpretations of student work in order to inform the learning process. Furthermore, in conducting formative assessment based on an organized learning model, teachers needed tools for associating student responses to assessment tasks back to the learning model to help them determine next steps in learning.

Interpreting results from formative assessment in terms of organized learning models. Studies investigating teachers' use of learning progressions as instructional tools (e.g., Alonzo & Elby, 2015; Furtak, 2012) have identified limitations regarding teachers' ability to consider evidence of student thinking in terms of the characteristics of different levels of understanding described in a learning progression. In these studies, teachers were inclined to judge student learning in terms of whether students had either attained or not attained a specified level in a learning progression. This "gets it/doesn't get it" perspective did not adequately support teachers or students in determining effective next steps in the learning process. Teachers needed more information tying specific teaching strategies or exemplary instructional practices to levels in the learning progression at hand.

Building on Up-to-Date Research or Practice-based Knowledge

The proposed project builds on and expands the use of learning maps currently employed as the basis of the Dynamic Learning Maps Alternate Assessment Consortium. During the initial development of the learning map, educators from the five partner states communicated that they thought learning maps could benefit all teachers and students by making explicit how learning can unfold along multiple pathways within a domain. In this section, we briefly describe how the proposed work will be informed by prior research and development of learning-maps based assessments. We then propose to extend the potential of learning maps to inform instruction and learning for all teachers and students by support-effective formative assessment.

Learning map development. The learning map consists of nodes and connections that represent the learning targets and pathways students should be expected to navigate in order to master the concepts, skills, and practices delineated in internationally benchmarked college- and career-ready standards. In developing the learning map, researchers consulted literature from the fields of mathematics education, English acquisition, and cognitive psychology. Panels comprised of content and special education teachers from the different states reviewed the learning map and provided feedback to the research team on many of its aspects. Subsequently, the research team continued to refine all aspects of the learning map, including the node names, descriptions, and connections. While the learning map is a living document, subject to refinement at any point in time, assessing the validity of the arrangement of the nodes and connections is included in the goals of the Dynamic Learning Maps Alternate Assessment Consortium. That validation process includes quantitative studies using data collected from assessments designed to measure student achievement in terms of probabilities that estimate which nodes the students have mastered.

Instructional uses of learning maps. Learning maps have the potential to serve as the foundation of the professional development and resources teachers need to implement personalized instruction. Learning maps provide the means to consider what comes before and after a specific skill, helping less experienced teachers in particular to direct their teaching on what students need without the

additional burden of trying to identify critical prerequisites on their own. However, previous research investigating teachers' use of learning maps as instructional tools has determined that the learning maps on their own are inadequate (Broaddus & Sharma, 2015; Kingston, Broaddus, & Pardos, 2014).

Teachers want instructional materials that align to a learning map with sufficient supporting materials to describe essential prerequisites and important conceptual connections (Broaddus & Sharma, 2015; Kingston, Broaddus, & Pardos, 2014). They want lesson plans, discussion questions, and relevant tasks to support class-level personalized instruction. Materials should explicitly point out multiple pathways when they exist, allowing for variations in student learning and instructional approaches. Learning maps for particular standards or collections of standards should make explicit the different locations where students of different skill levels could be located in relation to the learning goal and should show the different pathways to reach the learning goal based on their current skill level. Whereas the learning maps particularly benefit less experienced teachers, serving to help them understand sequences of learning, experienced teachers can also benefit from learning maps that show the connections among nodes that support understanding, which can ultimately suggest updated instructional approaches that were previously not obvious. Learning maps, associated professional development, and formative assessment materials have the potential to provide teachers with the instructional supports the need to guide students of all ability levels along the path towards standard mastery.

The learning map alone is limited in its ability to impact teaching, but the learning map with relevant and specific materials can provide a benefit to both teachers and students by fostering the conditions for effective formative assessment.

Coherent, Sustained Research and Development Plan that Extends an Ongoing Line of Inquiry

We propose learning maps as effective tools for supporting formative assessment practice to improve student achievement. Our unique contribution is to provide tools specifically designed to help teachers and students tie evidence of student thinking directly to where students are in their learning,

providing the basis for actionable feedback (Hattie & Timperley, 2007). The proposed work will provide professional development and suites of materials designed to engage teachers and students in classroom activities that foster the conditions for (1) developing understanding consistent with theories embedded in the learning maps, (2) engaging in rich discourse that exposes student thinking and provides opportunities for effective feedback, and (3) generating evidence of student learning through performance tasks and object measures of learning linked to learning maps.

Through this work we will aim to address several research questions. Does the learning-maps based system of online formative assessment supports and materials improve student performance? How does the design of the system support teachers? What features of the system do teacher believe best support their use of learning maps to support their formative assessment practices? How effective is the system for supporting teachers in practicing formative assessment that yields improvements in student proficiency as measured by summative state assessments?

To address these research questions, we will work closely with teacher participants throughout the project, collecting both qualitative and quantitative data that we will use in an iterative fashion as we proceed through the phases of the project.

Specific Research Design

We propose using an educational design research methodology (Kelly, Lesh, & Baek, 2008; van den Akker, Gravemeijer, McKenney, & Nieveen, 2006) to create learning-maps based professional development and formative assessment materials for teachers. A key element of design research is the integration of theories with actual practice established through engaged scholarship, whereby researchers collaborate with practitioners (e.g., teachers and educational leaders) and theorists (e.g., prominent researchers in the fields of formative assessment, teacher education, special education). Through the proposed project, the PD materials will be designed collaboratively with practitioners in schools with guidance from prominent expert researchers to enhance teachers' ability to implement effective formative assessment.

Educational design research allows for the analysis of an intervention through the iterative process of design, evaluation, and revision grounded in theoretical propositions (van den Akker, et al., 2006). Furthermore, the results of educational design research are typically artifacts of an integrated process rather than answers to specific questions. The artifacts are often “models or related conceptual tools” whose effectiveness is determined by criteria such as usefulness and transferability to other settings (Kelly et al., 2008). This project will implement iterative cycles to explore the utility of learning maps as the basis of professional development and materials supporting teachers in implementing formative assessment and providing effective feedback students can use to improve their academic achievement.

Iterative design. Project activities will iterate in large and small cycles. Large cycles will be implemented to address initial development activities and increase teacher participation during each year of the project. Small cycles will be implemented within the large cycles to develop, publish, and evaluate the materials associated with each learning map.

The project will unfold over four large cycles, primarily determined by the academic years of the funded period. The first large cycle, 2015-2016, will focus on development of the learning map structure and technology to support the identification of the standard-specific learning maps, which will be the basis of formative assessment activities and materials. In this first cycle, researchers in CETE will construct the learning maps and consult with expert and teacher reviewers to confirm the nodes and their arrangements reflect the research literature and observations of student development. The first large cycle will also include development of the professional development modules and formative assessment materials that will be piloted during the second large cycle.

During the second and third large cycles (2016-2017, 2017-2018), project activities will include enhancements to the technology and development of more learning-maps based professional development modules and formative assessment materials to improve the online experience and increase the library available to participating teachers. In 2016-2017, the project will invite 10 teachers from each state (i.e., 50 teachers) to participate in project activities. Teacher participants will attend one summer professional development workshop to acquaint them with the software interface and learning-maps based materials.

Throughout the academic year (2016-2017), teachers will implement available activities and provide feedback through survey instruments and personal communications with the content teams. In 2017-2018, the project will invite 20 teachers from each state (i.e., 100 teachers) to participate in project activities. Ideally, half of these teachers will have participated previously and will each recruit one colleague as a new participant. Teacher participants will again attend a summer professional development workshop to implement available activities and provide feedback throughout the following academic year.

During the fourth large cycle, project activities will focus on scaling up the number of participating teachers and refining learning-maps based materials. In 2018-2019, the project will invite an average of 80 teachers from each state (i.e., 400 teachers) to participate in project activities. Ideally, one-fourth of these teachers will have participated previously and will each recruit three colleagues as new participants. Teacher participants will again attend a summer professional development workshop implement available activities and provide feedback throughout the following academic year. Additional activities during 2018-2019 will focus on examining the effectiveness of learning maps focused formative assessment to improve student performance.

Within each large cycle, small cycles will be implemented to develop each content-specific learning map and associated materials. These cycles will include steps to

1. Identify the nodes related to a particular standard or group of standards; save a view of this learning map in the online interface; and create, audio-record, and upload a description of the rationale for the learning map;
2. Create a specific or prototype classroom activity for the nodes in the learning map and upload it in the online interface;
3. Create a student-level performance task drawing out knowledge of the nodes in the learning map; create a rubric for the performance task that relates anticipated student responses to the likely mastery or non-mastery of nodes in the learning map; and upload both documents in the online interface;

4. Create objective item sets assessing knowledge of the nodes in the learning map; publish these item sets with keys to participating teachers for use in their classrooms;
5. Publish information to participating teachers that the suite of materials is available along with instructions for providing feedback about these materials;
6. Gather and analyze educator feedback; and
7. Adjust materials; publish revised materials; and notify participating teachers.

The project will encourage feedback to be submitted at any time and will establish quarterly schedules for updating and publishing revisions to materials. Whereas small cycles will foster the engagement of educators within our research activities, we will also collaborate between and within each large cycle with an advisory board composed of prominent researchers in formative assessment, teacher education, and special education, to ensure our research activities continue to reflect the best practices and most up-to-date scholarship in regards to teachers' uses of organized learning models as tools to support their formative assessment practices.

Technology to support learning maps based formative assessment. While preparing lesson plans and monitoring progress of individual students and the class as a whole, teachers must refer to a variety of data associated with learning maps at various resolutions. Static displays are inadequate because the amount and type of data that would be needed cannot be presented simultaneously in a way that could be comprehended. A combination of interactive techniques such as brushing, zooming, and traditional menu button interfaces will be needed to present the information needed on demand.

The subset of information needed at any time is task-dependent: so, too, is the graphical encoding that will be best suited to display it. Jacques Bertin introduced the seven visual variables (position, color, shape, size, value, texture, and orientation) that can be used to encode information in a display as well as a task-based characterization of how effective each is for given generic tasks such as selection, association, and quantification (Bertin, 1967/1983). Since the publication of Bertin's work, several other groups have confirmed and expanded on this base (e.g., Spence, 2007; Keim et al., 2008; Keim,

Kohlhammer, Ellis, & Mansmann, 2010; Ward, Grinstein, & Keim, 2010). Motion is now well-accepted as an eighth visual variable.

Effective use of color must be carefully planned so that all uses across all displays is consistent and in accordance with well-established research findings. For example, color is poorly suited for quantitative-based tasks, but well-suited for association tasks (Spence, 2007; Keim et al., 2008; Ward et al., 2010). For tasks that use color, effective color schemes must be established and used consistently throughout the system. One well-known and often-cited resource is ColorBrewer (Brewer, Harrower, Sheesly, Woodruff, & Heyman, 2015). While designed and developed initially in a Geographic Information System (GIS) context, ColorBrewer is regularly used in many other visualization applications.

Effective interactive display and query of learning maps will require a design driven by these underlying concepts and verified and tuned by classroom teachers observing them in use. The work proposed here will consist of three major parts: (1) design of a learning map node structure that is minimal, but dynamically expandable, (2) design of a node connection mechanism that allows realistic pre- and co-requisite relationships between the nodes, and (3) an interactive visualization-based query mechanism so that teachers can effectively plan lessons while monitoring student and class progress. Successful completion will address Competitive Preference Priority 2a, “implementing high-quality accessible digital tools, assessments, and materials,” since the tools will be in the public domain as open-source software developed in accordance with professional software development practices. It will also address Competitive Preference Priority 2b, “using data platforms that enable the development, visualization, and rapid analysis of data to inform and improve learning outcomes” by providing teachers with powerful tools to visualize per-student mastery of educational concepts across all nodes of a learning map as well as per-class mastery of educational concepts corresponding to a given node. Since these levels of mastery will vary with time, we will also seek to develop schemes for visualizing these levels of mastery over time.

Methodology

Our design research methodology will include collaborations with teacher participants, state education agency leaders, and researchers with expertise in formative assessment, intervention strategies and designs, mathematics education, reading education, and teacher education. Through these collaborations and our iterative process, we will invite teachers to actively engage in the design, testing, and refinement of learning maps and related tools for formative assessment. We will simultaneously collaborate with state partners and researchers to establish an environment of engaged scholarship promoting the integration of theoretical and actual formative assessment practices.

Participants. This project will include teacher participants during the second, third, and fourth years and student participants during the fourth year. Teachers will participate through professional development workshops, implementing formative assessment materials, and providing feedback on their uses of the materials and reflections of their formative assessment practices. In the fourth year of the project, we will assess the fidelity of implementation through observations and surveys administered to participating teachers. The anticipated numbers of teacher participants for each year of the project are shown in Table 1. We assume for each teacher there will be about 20 participating students. Students will participate through their classroom activities and by completing performance tasks; students will participate directly through their state assessment scores, which will be used to evaluate the effectiveness of the system of materials provided herein to improve student achievement of rigorous academic standards.

Table 1. Teacher and Student Participation

Dates	Teachers	Estimated Students	Teacher Activities
Oct 2016 – Jun 2017	N/A	N/A	N/A
Jul 2016 – Jun 2018	50	1,000	<ul style="list-style-type: none"> • Summer 2016 training event, Kansas • Implement formative assessment activities • Submit feedback
Jul 2017 – Jun 2019	100	2,000	<ul style="list-style-type: none"> • Summer 2017 training event, Kansas • Year 2 teachers mentor new Year 3 teachers • Implement formative assessment activities • Submit feedback
Jul 2018 – Jun 2019	400*	8,000	<ul style="list-style-type: none"> • Summer 2018 training held in each state • Year 2-3 teachers mentor new Year 4 teachers • Implement formative assessment activities • Submit feedback

*400 participating in the study and another 400 identified by propensity score matching who will be used as a control group.

Data. We will collect and analyze data to examine the fidelity of implementation of the use of learning maps and associated materials for formative assessment as well as data to evaluate the effectiveness of the learning-map based formative assessment approach to improve student achievement. To assess teachers' use of the learning maps and related materials hosted in the learning maps online interface, we will record and analyze the number of times teachers visit the learning map interface, how long teachers remain active in the interface, the number of searches they enact, the number of times each learning map resource is opened, and the number and records of the specific resources teachers download.

In addition, we will distribute surveys to gather feedback on each set of materials, which we will use within our editing processes and to assess the perceived value of the learning map and formative assessment materials.

To assess the effectiveness of learning-maps based formative assessment on student achievement, the project will identify matched groups of students and apply propensity score analyses using state assessment data from 2018 and 2019 as pre- and post-tests for students taught by participating teachers in the partner states. These analyses will address the extent to which the system of tools, when used with fidelity, lead to improved student achievement. We anticipate one result of these analyses will be the ability to consider a distribution of teacher effects on student achievement through their implementation of learning-maps based formative assessment.

Quality Control

Prior to designing learning-maps based professional development and other materials, the content of the learning map will be reviewed. The learning maps were developed using empirical research, curriculum, and instructional information. The DLM assessment provides validity to the arrangement of the nodes and connections in the learning maps. Statistical analyses using student responses on items linked to specific nodes will verify the degree to which the learning maps represent the content. To provide further verification, content experts will review the learning map to verify the degree to which it reflects skill development as depicted in the empirical research. These experts will determine the degree to which the pattern of nodes and connections are correct. Elementary and middle school teachers will also review the learning map's content to verify the extent to which it reflects their observations about typical student learning. These reviews of the learning map will ensure the corresponding professional development materials reflect current empirical, instructional, and curricular knowledge on the content areas and provide accurate guidance in personalized instruction.

As part of the project's iterative research design, project leaders will employ expert and teacher reviewers of the learning maps and feedback tools for participating teachers to complete as they use the materials developed for this project. This design will permit ongoing evaluation of the usability of the

interface as well as iterative improvements of the learning maps based descriptions, classroom activities, and assessment tools provided throughout the project. While feedback will be encouraged at all times, the first three project years will be focused on development and refinements of published materials, whereas the focus will shift to large scale use and effectiveness in the fourth project year.

Implementation After the Grant

The potential for learning maps to have an enduring effect on formative assessment practices will be enhanced by the intended broad availability of the products developed during this project. During the four-year project, CETE will host a website where teachers will access the learning map and formative assessment materials. After the project ends, CETE will host a website where users who agree to licensing terms (i.e., to host materials for non-commercial use) will be able to download the learning maps software and formative assessment content for independent hosting.

Based on conversations among educators, educational leaders, parents, and students during the past three years, we expect learning maps to provide an array of additional uses to support student learning. Learning maps and linked materials can support teachers and students working together in flipped classrooms and online learning situations by providing a visual tool for viewing learning goals and student progress. Similarly, learning maps can support teacher collaborations targeting focused interventions, individualized education plans, as well as providing a place to share materials related to specific lessons or content topics. Learning maps can also be used to illustrate the scope of a particular content course offering and relationships to other courses or career pathways, providing students, advisors, and parents a unique lens for considering enrollment and expectations of students.

Project Services

This project's goal is to provide a suite of professional development and formative assessment tools that are high in quality, intensity, and duration that will lead to improved formative assessment practices among teachers and students in our five partner states. Our first research question echoes these

themes by addressing the effectiveness of the system we provide and teachers’ perspectives on its utility for their work with students.

We believe our system will lead to improvements in student achievement of rigorous academic standards, which is described in our second research question. We will evaluate the effectiveness of this system in the fourth year of the project by examining the relationships among teachers’ uses of system components and student state assessment data in our participating states.

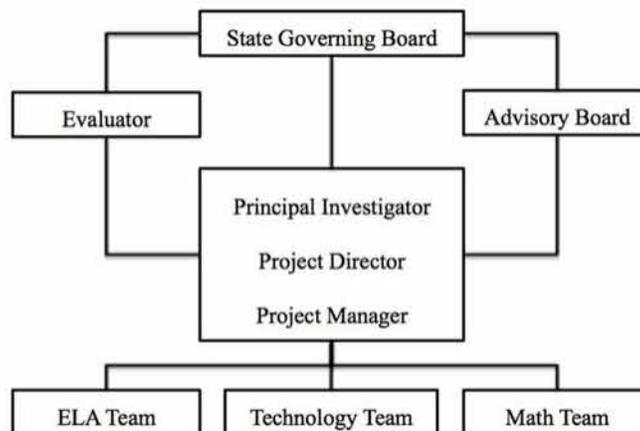
This project will address teachers’ formative assessment practices, thereby focusing on a research-based strategy for helping all students achieve grade-level proficiency through iterative assessment of their progress. By its very nature, formative assessment is a proven practice for promoting equal access and educational opportunities for individuals from traditionally underrepresented groups.

Management, Personnel, Resources

Project Management

The project will benefit from collaborations among five partner states, an advisory board, project leadership, project staff, and an evaluator. These entities and the expected relationships among them are shown in Figure 3.

Figure 3. Project Management Structure



Structure. The State Governing Board, Advisory Board, and Evaluator will together guide the Project Leadership Team on project decisions, activities, and products. The State Governing Board will include representatives from each of the five partner states and will be responsible for overseeing the project and conferring to make decisions that guide the overall direction of the project. The Advisory Board will provide expert judgments and services to steer the project goals and activities, ensuring all products and services are informed by and comply with established best practices and current research. The Evaluator will provide formative feedback throughout the project, which will be used to refine decisions and adjust project activities. The Project Leadership Team will include the Principal Investigator, Project Director, and Project Manager, who will lead and direct project activities under the advisement of the State Governing Board, Advisory Board, and Evaluator. Two content teams—English language arts and mathematics—will report to the Principal Investigator and Project Director and be responsible for creating and publishing the materials to support learning-maps based formative assessment. The technology team will also report to the Principal Investigator and Project Director and be responsible for creating, updating, and supporting an online software solution for updating learning maps and attaching materials, which supports the content teams for materials development and supporting teachers as they use the learning maps and associated materials in the day-to-day teaching.

The project will be administered by the Kansas State Department of Education project administrator and managed at CETE, led by the principal investigator, Dr. Neal Kingston, and co-principal investigator/project director, Dr. Angela Broaddus. Additional staff will include a full-time project manager at CETE. Dr. James Miller, Professor of Electrical Engineering and Computer Science, University of Kansas, will lead the development of the technology to support learning maps development, refinement, and hosting of formative assessment materials. Dr. Russell Swinburne Romine and Dr. Angela Broaddus, CETE curriculum and assessment experts for English language arts and mathematics, respectively, will lead learning maps and materials development and will support data analysis and interpretation.

Schedule. The project will include a combination of face-to-face and virtual meetings and training events throughout the four-year plan. The schedule shown in Table 2 illustrates the iterative design described above. As the schedule indicates, content will be developed, reviewed, and revised during the first three years of the project, with refinement continuing into the fourth year. Technology will be developed for the first three years of the project and remain available

Table 2. Project Schedule

Project Tasks	Oct 15–Sep16				Oct15–Sep16				Oct15–Sep16				Oct15–Sep16			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Content Development	[Bar chart showing development of content tasks across four years]															
<i>Learning map</i>	[Bar chart showing development of Learning map across four years]															
<i>Standards maps</i>	[Bar chart showing development of Standards maps across four years]															
<i>PD modules</i>	[Bar chart showing development of PD modules across four years]															
<i>Classroom activities</i>	[Bar chart showing development of Classroom activities across four years]															
<i>Teacher activity guides</i>	[Bar chart showing development of Teacher activity guides across four years]															
<i>Instructional videos</i>	[Bar chart showing development of Instructional videos across four years]															
<i>Performance tasks</i>	[Bar chart showing development of Performance tasks across four years]															
<i>Rubrics</i>	[Bar chart showing development of Rubrics across four years]															
<i>Objective item sets</i>	[Bar chart showing development of Objective item sets across four years]															
<i>Content refinements</i>	[Bar chart showing development of Content refinements across four years]															
Technology	[Bar chart showing development of technology across four years]															
<i>KMap interface design</i>	[Bar chart showing development of KMap interface design across four years]															
<i>KMap development</i>	[Bar chart showing development of KMap development across four years]															

Project Tasks	Oct 15–Sep16				Oct15–Sep16				Oct15–Sep16				Oct15–Sep16			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Collaborations	[Solid bar across all quarters]															
<i>Teacher training</i>			■				■				■					
<i>Teacher implementation</i>			■			■			■			■				
<i>Teacher feedback</i>		■					■					■				
<i>Student data collection</i>											■				■	
<i>Governance meetings</i>			■				■				■					■
<i>Governance webinars</i>	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Evaluation	[Solid bar across all quarters]															
<i>Formative</i>	[Solid bar across all quarters]															
<i>Summative</i>															■	

Note 1: Centralized teacher training in July 2016 will include 50 teachers. Centralized teacher training in July 2017 will include 100 teachers. Decentralized, state-level trainings in July 2018 will include, on average, 80 teachers per state.

Note 2: Governance meetings will include State Governing Board, Advisory Board, Project Leadership, and Evaluator, with support for the duration of this project. Collaborations with teachers, state leaders, advisors, and the evaluator will occur throughout the four years of the project.

Staffing

Principal Investigator, Neal Kingston, PhD, is a Professor in the Educational Psychology Department at the University of Kansas and serves as director of the Achievement and Assessment Institute. He is also director and principal investigator of the DLM Alternate Assessment Consortium. Dr. Kingston’s research focuses broadly on improving large-scale assessments so they better support student learning, especially the use of instructionally embedded, instructionally relevant assessments based on

fine-grained learning maps. Dr. Kingston started his career as a high school science teacher. Dr. Kingston received his doctorate in Educational Measurement and Research Design from Teachers College, Columbia University. Before coming to KU in 2006, Dr. Kingston was a researcher and then executive at several educational testing companies (Educational Testing Service, Measured Progress, and CTB/McGraw Hill) and Associate Commissioner for Curriculum and Assessment at the Kentucky Department of Education during the early years of the Kentucky Educational Reform Act.

Project Director, Angela Broaddus, PhD, is a Research Associate at the Center for Educational Testing and Evaluation, where her research foci have included the application of attribute hierarchy methods of cognitive diagnosis to mathematics as well as the research, development, and modeling of the learning map used as the foundation of the Dynamic Learning Maps Alternate Assessment system. Most recently she has refined the mathematics learning map to be relevant for all teachers and all students while designing an intuitive interface for teachers to use as they explore the learning map and incorporate the learning map as an instructional tool. After teaching secondary mathematics for fifteen years in a myriad of different school settings, Dr. Broaddus received her Ph.D. in Mathematics Education from the University of Kansas in 2011. During her time at CETE, Dr. Broaddus has also served as test program coordinator for formative and interim assessments and as product manager for AAI's Kansas Interactive Testing Engine (KITE™) software platform, which includes a content editor, test delivery engine, educator portal, and the learning maps application.

Russell Swinburne Romine, PhD, DLM English Language Arts Research Team Lead, is responsible for overseeing the ELA test development process, including content decisions related to the test blueprint, test specifications, item-writing standards and guidelines, internal item review, and external item review. He is responsible for the development and revision of the ELA sections of the learning map. In addition, he conducts research in support of DLM test development in areas of text complexity and accessibility of ELA content for students who are blind or have visual impairments and in support of validity arguments for the assessment system. Additionally, he contributes to technical documentation and training materials for DLM. Dr. Romine earned his doctorate in Educational Psychology from the

University of Minnesota. His research interests are in the areas of intersection between developmental psycholinguistics and large-scale assessment of reading comprehension. His current research focuses on texts and assessments designed to support students with significant cognitive disabilities in developing literacy skills. Before coming to KU, he taught classes in educational psychology and educational measurement at the University of Minnesota.

Jonathan Schuster, PhD, received his doctorate in cognitive psychology from the University of Kansas, focusing primarily in psycholinguistics. While at the Center for Educational Testing and Evaluation, he has worked primarily on the Dynamic Learning Map Consortium project, focused on creating an alternate assessment for students with significant cognitive disabilities, who demonstrate a wide variety of communication difficulties. This assessment was developed on the basis of a learning map. Because of his psycholinguistic background, he serves on the team creating the ELA portion of the learning map. Using the research literature documenting the development of the skills associated with ELA, this team initially created the learning map to represent the Common Core State Standards and all the skills starting from birth and ending at the end of high school that contribute and support learning of those standards. Recently the map has been adapted to account for the needs of students with significant cognitive disabilities, including multiple pathways toward a target standard to represent and promote the learning of readers of varying skill and ability levels. Dr. Schuster's experience in constructing the learning map will be invaluable to the proposed project in identifying learning map sections containing a group of related academic standards and the relevant skills supporting their development. After the map sections have been identified, he will guide the creation of professional development materials, including instructional documents, focusing on the individual skills located in each map section.

James Miller, PhD, has active research and teaching interests in computer graphics, large-scale multidimensional and multivariate data visualization, geometric modeling, and technology in education. After receiving his Ph.D., Dr. Miller spent eight years working in industry before returning to academia at the University of Kansas in 1987. Miller frequently collaborates with faculty in other departments (education, geography, mathematics, physics, and others) on applications of Scientific Visualization. He

is also the chair of the eLearning Research Collaborative (eRC), a research laboratory that is pursuing interdisciplinary research related to the development of technology in education.

Richard Branham, MFA, is a professor of Industrial Design at the University of Kansas, working in areas of cognitive human factors and interaction design strategies, methods, and techniques, specializing in wayfinding, navigation, and use models. He has over 30 years of professional experience developing interfaces between people and technology and 25 years of teaching and research experience. He holds BFA and MFA degrees from the University of Kansas and an MS degree from the Institute of Design, Illinois Institute of Technology (IIT). Professor Branham founded the Information and Design Systems Division of Unimark International. He founded the Design Planning Group in Chicago. Major clients have included Carlton Centre, Johannesburg, Gillette Company, Marshall Field, J. C. Penney, New York, Volkswagen, and Westinghouse.

A **Project Manager** will coordinate the day-to-day tasks of the Project Director and will be the primary liaison between the Kansas State Department of Education and CETE. The Project Manager will have primary responsibility for managing the logistics of project activities, assisting the Project Director with communications, travel and arrangements for training events, meetings, and conference calls. The Project Manager will be responsible for managing the funding of CETE activities for the proposed project and will ensure that the project is on track with regard to the all activities and expenditures.

Nancy Lister, Project Administrator, will represent the Kansas State Department of Education. She will liaison with the Project Director, Project Manager, and other project staff to monitor, manage, and document the use of funds as well as assisting with logistics for project meetings and training events. She will also interact with state representatives as needed to establish and maintain open lines of communication among state partners and the research staff.

Evaluator, Dr. Kimberly Good, Managing Evaluator with McREL, serves as the evaluation project director for several evaluation projects. Her evaluation portfolio includes five multiyear projects funded through the U.S. Department of Labor and the U.S. Department of Education, one of which is an Enhanced Assessment Grant. Dr. Good favors a multi-method, participatory approach to evaluation and

employs both qualitative and quantitative evaluation methods. She will use her expertise in research and evaluation to provide formative data to support the project’s development and implementation and execute a summative evaluation to gauge the success of the project in attaining its goals and to measure project impact. She earned a BA in science education from the University of Northern Iowa and an MA in educational psychology from the University of South Dakota. She also holds a PhD in educational leadership with emphases in program evaluation, measurement, and research design from Western Michigan University.

Advisory Board. An Advisory Board will consist of five researchers, named in Table 3, with expertise in the areas of formative assessment, teacher education, special education, mathematics education, reading education, and classroom assessment. We invite these established experts to guide our research activities and materials development processes.

Table 3. Advisory Board

Name	Expertise
Margaret Heritage	Formative assessment
Russell Gersten	Special education, interventions for struggling learners
Karen Karp	Mathematics education, teacher education
Barbary Bradley	Reading education, teacher education
Bruce Frey	Classroom assessment, research methodology

Resources

The Center for Educational Testing and Evaluation (CETE) was authorized by the Kansas Board of Regents in 1983 to function as a research and evaluation unit under the Office of the Vice Chancellor for Research, Graduate Studies, and Public Service at the University of Kansas. CETE is now under the auspices of The Achievement and Assessment Institute (AAI) which was established in 2012 through the merger of CETE and the Institute for Educational Research and Public Services, established in 1997. Both

organizations have long track records of successfully building partnerships and programs that support the achievement of young children, school-aged children, adults, and publicly funded agencies. Effective July 1, 2013, AAI was recognized by KU's Office of Research and Graduate Studies as one of just 12 designated university research centers and institutes.

CETE has over 150 staff members including faculty, PhD research associates, masters-level research assistants, doctoral students, and others. CETE is unusual for a university research center in that many staff members have previously had successful careers working for educational testing programs and/or state departments of education including Applied Measurement Professionals, CTB McGraw-Hill, Educational Testing Service, Measured Progress and departments of education in Kentucky, Mississippi, North Carolina, and Wyoming. The staff has expertise in psychometrics, curriculum and instruction, test development, editing, web design, software development, computer science, and event planning. CETE has developed and delivered the state assessments for the state of Kansas for over 30 years, and has developed state assessments for the state of Alaska since 2014. CETE develops summative and interim assessments, as well as formative tools, for both states in English Language Arts and Mathematics and is also currently working with the state of Kansas to develop a new science assessment aligned to the Next Generation Science Standards. This will replace Kansas's previous science assessment based on a prior set of content standards.

CETE is the lead organization in a five-year federal initiative called the DLM Alternate Assessment System Consortium. CETE, along with 18 partner states and other partners including the Center for Literacy and Disability Studies at UNC Chapel Hill, design and develop a learning-maps based assessment system to support teachers in improving the learning of students with the most significant cognitive disabilities. First delivered for large-scale use during the 2014–2015 school year, the Dynamic Learning Maps (DLM) Alternate Assessment System lets students with significant cognitive disabilities show what they know and can do and is designed to more validly measure the academic knowledge, skills, and understandings of students with significant cognitive disabilities. The assessment system is structured around a learning map, which models many potential pathways students may take on their path

to gaining academic content. The map is populated by a connected network of thousands of sequenced learning targets, or skills that students need to learn by the end of high school.

CETE is also the lead organization for a collaborative effort currently funded by three states to develop career pathways assessments. The Career Pathways Assessment System (cPass) is an innovative assessment for determining students' career readiness. This innovative program includes multiple-choice and technology-enhanced items and field experiences aimed at guiding and certifying students in their career development. Like DLM, cPass uses the KITE system to administer computer-based tests with innovative item types and performance assessments. The cPass system will be a meaningful and reliable way of measuring students' abilities to meet the demands of the ever-changing global economy and its complex industries. Students will use cPass during secondary education to identify their competence in a chosen career pathway, but can also use it to clarify their readiness for a postsecondary program, apprenticeship, or entry-level job related to their program of study.

CETE currently serves more than 400,000 students in 19 states, delivering high-quality assessments that are aligned with rigorous content standards in order to measure students' readiness for their next educational or career endeavors. Experienced test developers create test questions that are valid, reliable, and fair for all students; that assess student achievement in multiple ways while maintaining fidelity to the constructs being measured; that assess student mastery at deeper levels of cognitive complexity by including both machine- and hand-scorable performance tasks; and that mirror the best instructional practices of master educators.

CETE's office is located in Joseph R. Pearson Hall, a 105,000-square-foot facility that also houses the four academic departments of the School of Education, including the Department of Educational Psychology. The building contains fully equipped statistics and instructional technology labs, a microcomputer lab, a library and media resource center, a telecommunications and videoconferencing classroom, offices, conference rooms, and research suites. AAI and CETE maintain the necessary infrastructure to effectively support the scope of this research initiative, including all of the necessary personnel and equipment for scanning, faxing, copying, and word processing, as well as statistical and

psychometric analyses. Researchers also have access to the many resources available through the University of Kansas at-large, including libraries and conference facilities.

Evaluation Plan

Qualifications and Experience

McREL International, a 501(c)(3) private non-profit organization whose purpose is to improve education through applied research and development, will be responsible for conducting the project evaluation. McREL has more than 40 years of experience conducting research and evaluation, developing resources and tools, and providing technical assistance, professional development, and consultation in system improvement, the development of standards-based programs, student assessment, evaluation and policy studies, strategic planning, out-of-school-time learning, and leadership development. McREL's headquarters are located in Denver, Colorado with additional offices in Nashville, Tennessee; Charleston, West Virginia; Honolulu, Hawaii; and Melbourne, Australia.

Dr. Kimberly Good, managing evaluator, will serve as the evaluation director for the project. Dr. Good has worked in the field of evaluation for 20 years. Her resume details her experiences and areas of expertise, which currently include an evaluation of two other University of Kansas' funded assessment projects (EAG) and a General Supervision Enhancement Grant.

Evaluation Purposes

The evaluation will provide project staff with formative information about the extent to which the project is implemented as intended and summative information detailing the extent to which the project achieves its intended objectives. The goals of the evaluation are to provide valid, reliable monitoring and assessment of implementation and outcomes in order to provide meaningful, actionable information to project staff for the purposes of refining the program during implementation and assessing the quality of the model for impacting teachers' instructional practice and students' learning outcomes.

Following the philosophical paradigm of pragmatism (Mertens, 2005; Patton, 2002), the evaluation design uses the most appropriate methodologies for the questions of interest. McREL will

implement a rigorous, comprehensive evaluation grounded in questions that address both project implementation (formative) and project outcomes (summative). Table 4 depicts the evaluation questions and the proposed data collection methods aligned to each question. The data collection methods are described in the next section.

Table 4. Evaluation Questions and Data Collection Methods

Evaluation Questions	Data Collection Methods					
	Project records	Staff interviews	Training observations	Participant focus groups	Participant surveys	Student objective item sets
Formative (Process/Implementation)						
F1. How were the key strategies and activities of the project implemented?	X	X	X	X		
F2. To what extent were the key strategies and activities implemented with fidelity? What changes were made and why?	X	X	X			
F3. What were the operational strengths and weaknesses of the project during implementation?	X	X		X		
Summative (Outcome)						
S1. How did the teachers use the learning maps and resources (e.g., videos, classroom activities and performance tasks)? What types of instructional decisions did the teachers make as a result of use?				X	X	
S2. To what extent did project achieve its intended outcomes (e.g., changes in teacher practice in use of formative assessment for instructional decisions and student learning)?				X	X	X
S3. How effective was the collaboration amongst the partner states and participants?	X	X			X	

Evaluation Questions	Data Collection Methods					
	Project records	Staff interviews	Training observations	Participant focus groups	Participant surveys	Student objective item sets
S4. What project strategies can be replicated or sustained in other states?	X	X				

Data Collection Instruments

A mixed method design allows evaluators to gather information through multiple methods (e.g., qualitative and quantitative) and from multiple sources (e.g., participants, project staff, and state education agency [SEA] partners). Use of multiple methods will allow for triangulation of data across sources to either validate findings or pinpoint areas of discrepancy.

Project records. Data collected as a regular part of the project maintained by project staff will be used as part of the evaluation for documenting implementation. Such data may include, but is not limited to, meeting agendas and minutes, web analytics on access and usage of the learning maps and resources, and other relevant artifacts.

Project staff interviews. The evaluation will include individual and/or group interviews, as appropriate, with project staff including CETE staff as well as the SEA partners. The interview protocols will include a mix of structured and semi-structured questions focusing on implementation activities, facilitating or impeding factors and perceived impacts. These interviews will take place annually and likely be conducted by telephone.

Observations of training. The evaluator will attend each of the trainings in Years 1-3. The primary purpose will be to observe the professional development and assess the quality and adherence to the project design. Brief, informal interviews will take place with a convenience sample of 6-8 participants each day. The formative data will be summarized and shared with project staff immediately

following the training. Additionally, while on site, the evaluator will conduct focus groups with participants as described below.

Participant focus groups. Near the conclusion of the trainings held in Years 1-3, approximately 8-10 participants will be invited to take part in a focus group. The purpose of these focus groups is to gather in-depth, qualitative information about participants' reactions to the professional development, anticipated use of the learning maps and resources, and value of the collaboration. In Year 1, questions will be asked to further inform the development and refinements of the content and delivery mechanisms.

Participant surveys. Participants will be surveyed at multiple points of the project and for various purposes. The surveys, developed in consultation from CETE project staff, will gather data to assess participants' use of the learning maps and the resources and changes they have made in their instructional practices as a result of using the materials including using the formative assessment data. Gathering data on how formative assessment is being used as an instructional tool for implementing personalized instruction is of specific interest.

Student objective item sets. Project staff will develop brief (i.e., 10 question, multiple choice) item sets (i.e., mini tests) for each of the modules. Participants will administer the objective item sets to their students prior to introducing the content and then at the conclusion. Evaluators will analyze the pre- and post-test scores for evidence of changes in student learning. In order to ensure that it is permissible to use the data for the evaluation, data sharing agreements will be established by CETE with each state for the access of the student-level objective item sets data.

Advisory board meetings. The evaluation manager will attend the annual face-to-face advisory board meeting and the four two-hour webinars held each year. Participation in these meetings will be a useful source of documenting implementation and the key decisions influencing the project direction as well as inform the development of instrumentation.

Data Analysis

McREL evaluators will employ the most appropriate analytic techniques to examine the implementation and outcomes of the project. Before analyses are performed on survey data, evaluators

will screen the data and employ applicable techniques to manage missing values (e.g., nonresponses and missing items). Evaluators will conduct the most appropriate and feasible qualitative and quantitative analyses for the proposed evaluation questions.

Quantitative Data Analyses. A variety of statistics will be computed for any quantitative data collected for the implementation and outcome evaluation questions. Such statistics will include descriptive statistics (frequencies and percentages), measures of central tendency (mean and mode), and measures of dispersion (standard deviation and skew).

Qualitative Data Analyses. A variety of qualitative data sources will be used to amass a body of contextual knowledge about the project from multiple stakeholders. These data will help ensure a comprehensive understanding of how and why project results are achieved. The general approach to analyzing the qualitative data include the following concepts from interview analyses: *life world*, to understand what is being expressed by the interviewee; *meaning*, to understand and interpret the meaning of central themes; *specificity*, to obtain descriptions of specific situations; *focus*, to center the interview on themes as they emerge; *qualitative knowledge*, to obtain qualitative knowledge as expressed by interviewees; and *deliberate naiveté*, to be open to any new and unexpected phenomena (Kvale, 1996).

Qualitative data will be analyzed manually and/or by using appropriate software, so that prevalent themes and emerging issues will be identified. Thematic analysis is focused on identifying words or phrases that summarize the information being shared in the interviews. Data will be segmented into passages through coding. Emerging themes will be identified, and data will be reviewed for replicating categories. These categories will then be given broad codes; finer coding will be employed to identify patterns emerging within each coded set. Themes will then be summarized by salient, prevalent issues.

Timeline

A tentative timeline is depicted in Table 5. This timeline would be finalized in collaboration with project staff, as part of a start-up planning meeting, and data collection, analysis, and report production schedules would be updated accordingly.

Table 5. Evaluation Timeline

Project Activities	Year 1				Year 2				Year 3				Year 4			
	(2015-2016)				(2016-2017)				(2017-2018)				(2018-2019)			
	Q1	Q2	Q3	Q4												
Meetings and Planning																
Evaluation start-up meeting	x															
Monthly conference calls with project manager and evaluator	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Advisory Board meetings	TBD															
Data Collection Activities																
Instrument development, modification, and revision		x				x				x				x		
IRB reviews: new project, modification and ongoing	x			x				x				x				
Project records (ongoing)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Project staff/SEA interviews				x				x				x			x	
Training observation				x				x				x				
Participant focus groups				x				x				x				
Participant surveys						x	x			x	x				x	
Student objective item sets					x	x	x		x	x	x		x	x	x	
Data Analysis																
Project record review analyses				x				x				x				x
Project staff/SEA interview analyses					x				x				x			x
Training observation analyses				x				x				x				

Project Activities	Year 1				Year 2				Year 3				Year 4			
	(2015-2016)				(2016-2017)				(2017-2018)				(2018-2019)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Participant group/individual interview analyses			x					x								x
Student objective item sets analyses								x								x
Annual evaluation report analyses					x				x				x			
Final evaluation report analyses																x
Evaluation Deliverables																
Final evaluation design	x															
Informal evaluation summaries	As data are collected and summarized															
Annual evaluation report					x				x							
Final evaluation report																x

Note. Timeline assumes 10/1/15 start date. Q = Quarter; Q1 is October 1 - December 31; Q2 is January 1 - March 31; Q3 is April 1 - June 30; Q4 is July 1 - September 30 of each grant year.

Monitoring Progress and Reporting

Ongoing formal and informal communication and collaboration between project staff and evaluators will provide staff with updated information about the evaluation processes and early findings. In order to ensure data can be used to inform implementation efforts, brief written summaries of findings will be produced and shared with project staff within 2-3 weeks concluding data collection. McREL will also produce formal evaluation reports annually summarizing findings from data collected during the current year. Reports delivered in Years 1-3 will focus on formative evaluation findings. The final report will present findings from the summative evaluation. Conclusions will be drawn from the data-based findings, and recommendations for future implementation and replication will be provided. Evaluators will also

assist project staff in using evaluation findings to make programmatic changes by including clear and actionable recommendations in each summary of findings and in the evaluation reports.

All evaluation procedures and processes undertaken at McREL adhere to industry standards for high-quality research and ethical conduct, such as *the Guiding Principles for Evaluators* (American Evaluation Association, 2005) and *The Program Evaluation Standards* (Yarbrough, Shulha, Hopson, & Caruthers, 2011). Further, all evaluation plans and protocols will be submitted to McREL's Institutional Review Board to ensure the protection of human subjects.

Strategy to Scale

The potential for learning maps to have an enduring effect on formative assessment practices will be enhanced by the intended broad availability of the products developed during this project. As part of the project's iterative research design, teacher participation will increase from 50 teachers in Year 2, to 100 teachers in year 3, to 400 teachers in Year 4. During these years, project leaders will rely on teacher feedback to inform updates and improvements to published materials and usability of the web-interface. During the four-year project, CETE will host a website where teachers will access the learning map and formative assessment materials. To promote ongoing availability and broader use of learning maps as an organizing structure for formative assessment after the project ends, CETE will host a website where users who agree to licensing terms (i.e., to host materials for non-commercial use) will be able to download the learning maps software and formative assessment content for independent hosting.

In addition to sharing broadly the materials developed during this project, research staff and state partners will disseminate information about the development processes and research findings through national conference presentations and publications. Topics of study will include formative assessment, organized learning models, learning maps, teacher professional learning, teaching practices, student learning, interface design, participatory design, and educational design research processes.

Based on conversations among educators, educational leaders, parents, and students during the past three years, we expect learning maps to provide an array of additional uses to support student learning. Learning maps and linked materials can support teachers and students working together in

flipped classrooms and online learning situations by providing a visual tool for viewing learning goals and student progress. Similarly, learning maps can support teacher collaborations targeting focused interventions, individualized education plans, as well as providing a place to share materials related to specific lessons or content topics. Learning maps can also be used to illustrate the scope of a particular content course offering and relationships to other courses or career pathways, providing students, advisors, and parents a unique lens for considering enrollment and expectations of students.

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PROFILE

A public relations and administrative professional with leadership experience in listening and interviewing, using problem solving skills to work with business and civic leaders to address their business needs and find solutions to help their organization achieve its goals. A hard worker experienced in marketing and project management; executive and employee communications; advertising; supervision and facilitating teamwork; conflict resolution; desktop publishing; and events planning. Knowledgeable in matters of budgets and grant administration in the focus areas of workforce services, economic development, education, the arts, and health and human services. Communication skills are used to increase visibility, decrease cost, improve productivity, and promote goodwill, delivering exceptional results.

CORE COMPETENCIES

Customer/Government Relations Management
Executive & Employee Communications
Grants Management/Budget Administration
Event Planning/Trade Shows/Catering
Executive and Customer Complaint Liaison

Project Administration/Meeting Facilitation
Supervisory Administration/Mission Planning
Advertising Design & Production
Media Coordinator/Press Release Development
Desktop Publishing

Project Administration/Meeting Facilitation/Supervision

- Currently, serves as grant administrator and liaison between the principal research investigator and a multi-state team of state government education partners in facilitation of the grant; serves as primary grant contact for the Kansas State Department of Education (KSDE) with the U.S. Department of Education. The grant, *Accessibility For Technology-Enhanced Assessments (ATEA)*, a \$1.7 million dollar grant awarded by the U.S. Department of Education, is investigating the development of new item and task types of assessment questions for students who are blind, have low vision, or motor disabilities. Responsibilities include coordinating monthly webinar and conference call meetings between state partners, documenting all meeting outcomes which are posted on the ateassessments.org website; organizing and co-hosting Teacher Panel research meetings in five states; developing informative brochures communicating the goals of the ATEA project; budget and contract oversight, including approving and executing all grant expenditures; maintaining or amending contracts, as needed, between KSDE and The University of Kansas Center for Educational Testing and Evaluation, the research partner for the grant; finalizing annual progress reports sent in to the U.S. Department of Education.
- Served as committee assistant twice for one of the largest and busiest legislative committees in the Kansas Legislature. Duties included assisting the Committee Chair in all aspects of considering legislation assigned to the Judiciary committee, posting weekly hearing schedules, preparing daily hearing agendas, scheduling witnesses to testify, recording and transcribing the official minutes, maintaining a complete record of all bills considered and the final action taken, and supervising an office assistant in preparing and sequencing copies of testimony for committee and staff members to use daily.
- Served as project coordinator on a U.S. Department of Labor grant, *RA WORKS! (Registered Apprenticeship Works!)*, awarded to the Kansas Department of Commerce. Administrative oversight of all reports, board meetings, training and outreach materials; served as a resource for the local workforce investment board and commerce staff in the Kansas workforce centers. The three-year grant provided training opportunities for dislocated workers to acquire new skills in the areas of advanced manufacturing and wind energy.
- Owned and operated catering and floral businesses for 10 years providing the delivery of special holiday dinners, group buffet service, development of basket luncheons served at Ward Meade/Prairie Town events, wedding cake design and dinner banquets; fresh and silk floral arrangements designed for the entire wedding party participants, church floral decorations and reception tables decor.

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- Served eight years as a telecommunications marketing consultant to northeast Kansas businesses, working with decision makers to understand how telecommunications impacts their businesses, identifying communications problems, needs and wants, then working to design solutions and offer services to resolve communications issues and provide for future growth. Duties also included preparing and presenting oral and written recommendations, issuing all orders to implement changes, and providing good follow-up until all services were upgraded and the customer satisfied.
- Served as consultant on the State of Kansas telecommunications account during two-year conversion process implementing a statewide private long-distance calling network, the KANS-A-N (Kansas Agency) Network (#8 long-distance dialing). Duties included traveling to all state offices in thirty-four cities to explain the upcoming service, assessing the telephone changes required at the state agency office to accommodate the new services, issuing necessary telephone system upgrade orders at each location, and following through with the agencies to ensure that the installations were complete and correct. A new system was developed to bill for the unique system in Kansas, and continued coordination was maintained with the customer to address the appropriate growth needs after cutover of the service. The KANS-A-N Network initially saved taxpayers more than one million dollars the first year.
- Upon execution of the completed KANS-A-N Network, served in a new role as the network administrator and supervisor in order to growth manage the more than 700 private lines, foreign exchange and WATS line services that made up the KANS-A-N private long-distance network. Duties included analyzing circuit busy loads and recommending the additions and changes to circuit groups and central office trunks in order to maintain high quality of service for the State of Kansas. Supervised clerical staff in compiling and charting busy load data on each circuit group in order to correctly plot and project growth needs and make the appropriate recommendations.

Public Relations/Advertising/Project Development

- Served for more than ten years as writer, editor and producer of bill inserts and regulatory informational messages sent in customer monthly telephone bills to over one million business and residence customers. Served as editor of *The Kansas Heartland* employee newsletter and *The Community Spirit* newspaper for a local area organization.
- Created telecommunications product and foundation grant informative advertisements- from concept through production- for Kansas telephone directories and newspapers; also developed many product pamphlets and advertisements for sponsored theater programs. Materials were also developed for use with broadcast media throughout Kansas; created training materials for company employee use; developed grassroots campaign materials to assist in the efforts to obtain support for company telecommunications regulatory reform.
- Established the Kansas Community Enrichment Program, an annual \$400,000 grants program made available to benefit Kansas organizations in the areas of economic development, education, the arts and health care; created persuasive letters to request foundation funding, including a successful request for additional funding of \$100,000 dollars from the SBC Foundation for a Topeka civic theater capital campaign.
- Scripted more than forty speeches, talk points and presentations for delivery by the company president and department executives to deliver with employee groups, at state associations, boards, chamber and economic development organizations, and leadership conferences.
- Served as publicity coordinator for a multi-state regional organization, responsible for press releases and media contacts on activities in Kansas communities. Also served as media coordinator for a non-profit organization in Topeka.
- Created award winning employee sales referral program. Designed reference materials used by 3,500 Kansas employees and retirees to aid in increasing company sales. Over \$500,000 in new revenue was generated during the first year.

Leadership/Team Coordination/Event Planning

- Chaired successful statewide company United Way campaign, exceeding company's financial objective of reaching \$52,000.
- Recruited employee teams to participate in annual American Heart Walks.
- Coordinated with building contacts to organize local support and obtain annual food donations for Project Topeka in company locations.
- Departmental representative on cutover committee implementing the delivery of \$160 million dollars in improved 911 telecommunications services, fiber optics and new call technologies in more than thirty community central offices in Kansas. Responsible for timing the delivery of critical and accurate information on emergency services number changes and cut dates to ensure emergency services could be accessed at all times. New call management services were explained and offered to customers as individual community upgrades were implemented.
- SBC Foundation grant liaison, meeting with business, civic and non-profit leaders to discuss grant proposals for Foundation consideration. Responsible for annual disbursement and tracking of \$1.2 million dollars in grant awards, regional contributions, memberships and subscriptions, in support of 17 community relations managers in Kansas.
- Supervised clerical staff in order to track all SBC Foundation grant requests, approved grants, ordering of grant payments and in preparing annual budget.
- Chaired the team responsible for evaluating grant proposals and selecting the annual winners of the Kansas Community Enrichment annual grant program. Grant amounts allocated ranged from \$500 to \$25,000.
- Coordinator of the Minority Business Entrepreneur Program, an internal campaign to increase the use of minority vendors for company purchases.
- Attended civic and cultural functions, accepting awards on behalf of the company or SBC Foundation.
- Served as company Ambassador, working with small businesses to answer questions and resolve all service and billing issues. Grassroots manager for the TeleKansas Alliance Board, a group of community leaders throughout Kansas that supported telecommunications reform efforts.
- Planned and executed a diplomatic reception for Taiwanese congressman traveling with the Taiwan Beep Baseball Team, in conjunction with the World Series Beep Baseball tournament. Guests included local city and state officials, county commissioners, legislators and community business leaders.
- Organized and executed, two years in a row, a company picnic for 1,600 employees and their families while simultaneously, at a different location, held a VIP picnic for community business leaders and legislators with their families at Lake Shawnee during "Spirit of Topeka" Independence Day celebration. Recruiting volunteer employee teams was integral to the success of the events in the areas of set up, security, parking, catering, entertainment, games and prizes and clean-up.
- Spearheaded numerous receptions and dinners for company executives with employees, union officers, and external stakeholder groups throughout Kansas, overseeing invitations, meeting facilities, hotel and travel reservations, entertainment, agenda and food.
- Planned and manned exhibits at various business trade shows, the Kansas State Fair, minority business expositions, and for Kansas Commerce at the annual Kansas Wind and Renewable Energy Conference.

PROFESSIONAL EXPERIENCE

Grant Administrator (PSE II), Kansas Department of Education, Topeka, KS 2013 – Current

Judiciary Committee Assistant, Representative Lance Kinzer, Topeka, KS – 2012

Project Coordinator, Kansas Department of Commerce, Topeka, KS 2008 – 2011

Account Executive, Public Strategies, Inc., Topeka, KS 2006-2008

Administrative Assistant/Receptionist, United Way of Greater Topeka, KS 2005-2006

Judiciary Committee Secretary, Senator John Vratil, Vice President, Topeka, KS 2005

Interim Professional Assignments, Family Caregiver and Substitute Teacher, Topeka, KS 2001-2004

Area Manager-External Affairs Coordinator, SBC Corporation, Topeka, KS 1998-2000

Manager-Administrative & Grassroots Support, Southwestern Bell, Topeka, KS 1995-1997

Manager-Administrative Communications, Southwestern Bell, Topeka, KS 1984-1994

Owner, West Catering and Floral Design, Topeka, KS 1983-1993

Network Administrator – Analysis and Forecasting, Southwestern Bell, Topeka, KS 1980-1984

Business Service Consultant – Major Accounts, Southwestern Bell, Topeka, KS 1976-1980

Sales and Service Consultant, Southwestern Bell, Topeka, KS 1973-1976

Sales Project Clerk, Southwestern Bell, Topeka, KS 1971-1973

EDUCATION

Masters of Science in Management, Baker University, Overland Park, KS, 1993

Bachelor of Arts in Communications and Media Studies, Washburn University, Topeka, KS, 1986

ACKNOWLEDGEMENTS

Excellence in Publicity Award, Telephone Pioneers of America

Advocate of the Year Minority Business Entrepreneur Program Award, Southwestern Bell

Carolyn Terhune Ad Person/Volunteer of the Year Award, Topeka Advertising Federation

National 1st Place Award-Creative Design, International Association of Business Communicators

- Completed coursework in more than 90 telecommunications and leadership training courses throughout professional career. Courses include diverse product training and managerial enhancement courses including:

Leadership Skills
 Communications Workshop
 Joint Goal Setting
 Supervisory Relationship Training
 Managing Professional Growth
 Financial Communications Workshop
 Understanding Managing Performance
 Effective Business Writing
 Producing Results with Others
 Creating a High Performance Team
 Planning and Organizing
 Computer Security Awareness
 Safe Driver Training
 CPR and First Aid
 Franklin Planner System
 Seven Habits of Highly Effective People
 Managing Diversity in the Workplace

- Successfully completed Sales Assessment Center test taken from a six-month Harvard graduate project (completed test, given over three hours, measuring ability to comprehend material, present findings and make recommendations to improve a foundering business).

Computer training courses completed:

Microsoft Word	Outlook	Microsoft Works
Excel	HRN	Gifts for Windows
Access	Power Point	Aldus PageMaker
General Word Processing	Paint/Paintbrush	D-Base IV
Word Perfect	Paradox for Windows	Scan Gal

- Received extensive translations writing training for various central office telecommunications computers and training methods used to forecast busy load call volumes on trunks and circuits.
- Completed coursework in scriptwriting for video production and broadcast copywriting.
- Master's Degree coursework entailed broad emphasis on managerial skills:
 - Executive fundamentals
 - Human resource management
 - Business policy and laws
 - Managerial ethics and decision making
 - Issues management
 - Business Finance
 - Project Management
 - Oral and written thesis

Curriculum Vitae Neal Martin Kingston

EDUCATION

- Ph.D. Educational Measurement, Teachers College, Columbia University
M.Phil. Educational Measurement, Teachers College, Columbia University
M.Ed. Educational Measurement, Teachers College, Columbia University
M.A. Psychology in Education, Teachers College, Columbia University
B.A. Liberal Studies (concentrations in Biology & Education), Stony Brook University

EMPLOYMENT HISTORY

- 2006 – present University of Kansas, School of Education, Lawrence, Kansas
Director, Achievement and Assessment Institute, 2012 – present; Professor,
Psychology and Research in Education, 2012 – present; Program
Coordinator, Research, Evaluation, Measurement, and Statistics track 2010
–2011; Director, Center for Educational Testing and Evaluation, 2009 –
2012; Interim Department Chair, Psychology and Research in Education,
Fall 2009; Co-Director, Center for Educational Testing and Evaluation 2008
– 09; Associate Department Chair, Psychology and Research in Education,
2008 – 10; Associate Professor, Psychology and Research in Education,
2006 – 2012
- 2004 – 2006 CTB McGraw-Hill, Monterey, CA
Vice President - General Manager and Vice President of Research
- 1996 – 2004 Measured Progress (name changed from Advanced Systems in 1998),
Dover, NH
Senior Vice-President 1997-2004; Vice-President 1996-97
- 1996 Assessment Consultant
- 1993 – 1995 Kentucky Department of Education, Frankfort, KY
Associate Commissioner, Office of Curriculum, Assessment, and
Accountability
- 1991 – 1993 Assessment Consultant
- 1982 – 1991 Educational Testing Service, Princeton, NJ
Executive Director, Workplace Assessment and Training, 1990–91;
Director of Graduate Record Examinations Research and New Testing
Initiatives, 1989–90; Director of Graduate Record Examinations Research
and Test Development, 1987–89; Group Head, School and Higher Education
Programs Statistical Analysis, 1983–87; Senior Measurement Statistician,
School and Higher Education Programs Statistical Analysis, 1982–87
- 1981 – 1982 Los Angeles County Department of Personnel
- 1978 – 1981 Educational Testing Service, Princeton, NJ
Associate Measurement Statistician
- 1974 – 1976 Yonkers Board of Education, Yonkers, NY
Science Teacher

HONORS

2015 National Association of Assessment Directors Award for Outstanding Contributions to Educational Assessment

SELECTED PUBLICATIONS (19 of 73)

1. Kingston, N.M. & Clark, A.K. (2014). *Test Fraud: Statistical Detection and Methodology*. New York: Routledge.
2. Popham, W. J., Berliner, D.C., Kingston, N., Fuhrman, S.H., Ladd, S.M., Charbonneau, J. & Chatterji, M. (2014). Can today's standardized tests yield instructionally useful data? Challenges, promises and the state of the art, *Quality Assurance in Education*, 22(4), 300-316.
3. Adjei, S., Selent, D., Heffernan, N., Pardos, Z., Broaddus, A., Kingston, N. (2014) Refining Learning Maps with Data Fitting Techniques: Searching for Better Fitting Learning Maps. In Pardos & Stamper (Eds.) *The 2014 Proceedings of International Educational Data Mining Society*.
4. Ginsberg, R. & Kingston, N.M. (2014). Caught in a Vise: The Challenges Facing Teacher Preparation in an Era of Accountability. *Teachers College Record* Volume 116(1), 2014, p. - <http://www.tcrecord.org> ID Number: 17295, Date Accessed: 1/14/2014 9:30:47 PM
5. Kingston, N.M., Tiemann, G.C., & Loughran, J.T. (2013). Commentary on "Construct Maps as a Foundation for Standard Setting." *Measurement: Interdisciplinary Research & Perspectives*, 11, 181-184.
6. Kingston, N.M. & Anderson, G. (2013) The Efficacy of Using State Standards-Based Assessments for Predicting Student Success in Community College Classes. *Educational Measurement: Issues and Practice* 32(3): 3-10.
7. Kingston, N.M., Scheuring, S.T., & Kramer, L.B. (2013). Test Development Strategies. In Kurt Geisinger (Ed.) *APA Handbook of Testing and Assessment in Psychology*. Washington, DC: APA Books.
8. Kingston, N.M. & Kramer, L.B. (2013). High Stakes Test Construction and Test Use. In T. Little (Ed.) *Oxford Handbook of Quantitative Methods*. Oxford University Press.
9. Zheng, C., Erickson, A.G., Kingston, N.M. & Noonan, P. (2012). The Relationship among Self-Determination, Self-Concept, and Academic Achievement for Students with Learning Disabilities. *Journal of Learning Disabilities*, 46(2), 1-13.
10. Kingston, N.M. & Nash, B. (2012). How Many Formative Assessment Angels can Dance on the Head of a Meta-Analytic Pin: .2. *Educational Measurement: Issues and Practice*, 31(4): 18-19.
11. Cho, H.J. & Kingston, N.M. (2012). Why Individualized Education Program Teams Assign Low-Performing Students with Mild Disabilities to the Alternate Assessment Alternate Achievement Standards. *Journal of Special Education*. (Published online February 15, 2012).
12. Kingston, N.M., Tiemann, G.C., Miller, H.L., & Foster, D. (2012). An Analysis of the Discrete-Option Multiple Choice Item Type. *Psychological Test and Assessment Modeling*, 54, 3-20.
13. Almond, P., Kingston, N., Michaels, H., Roeber, E., Warren, S., Winter, P., & Mark,

- C. (2012). Technical considerations for developing assessments that include special populations and are based on organized learning models. Menlo Park, CA: SRI International and Lawrence, KS: Center for Educational Testing and Evaluation.
14. Kingston, N.M. & Tiemann, G.C. (2011) Setting Performance Standards on Complex Assessments: The Body of Work Method. In G.J. Cizek (Ed.) Setting performance standards: Concepts, methods, and perspectives, Second Edition. Mahwah, NJ: Lawrence Erlbaum.
 15. Kingston, N.M. & Nash, B. (2011). Formative Assessment: A Meta-Analysis and a Call for Research. *Educational Measurement: Issues and Practice*, 30:4, 28–37.
 16. Bechar, S., Sheinker, J., Abell, R., Barton, K., Burling, K., Camacho, C., Cameto, R., Haertel, G., Hansen, E., Johnstone, C., Kingston, N., Murray, E., Parker, C., Redfield, D., Rodriquez, J., and Tucker, B. (2010). Measuring Cognition of Students with Disabilities Using Technology-Enabled Assessments: Recommendations for a National Research Agenda. *The Journal of Technology, Learning, and Assessment*, Vol. 10, No. 4.
 17. Kingston, N.M. (2009). Comparability of computer- and paper-administered multiple-choice tests for K-12 populations: a synthesis. *Applied Measurement in Education* 22:22-37.
 18. Kingston, N.M. (2007). Future challenges to psychometrics: Validity, Validity, Validity. In C.R. Rao and S. Sinharay (Ed.) *Handbook of Statistics*, 26: Psychometrics. Amsterdam, The Netherlands: Elsevier.
 19. Kingston, N.M. and Ehringhaus, M. (2005). Use of technology and principles of universal design to improve the validity and fairness of licensure tests. In J.L Mouny and D.S. Martin (Ed.) *Assessing Deaf Adults*. Washington, DC: Gallaudet University Press.

SELECTED RECENT PRESENTATIONS

20. Clark, A., Karvonen, M., Kingston, N.M., & Anderson, G. (April 2015). Designing Alternate Assessment Score Reports that Maximize Instructional Impact. Paper presented at the annual meeting of the National Council for Measurement in Education, Chicago, IL.
21. Kingston, N.M. (April 2015). Standard Setting and Growth Measurement in a Learning Maps Environment. Symposium: Psychometrics in a Learning Maps Environment at the annual meeting of the National Council for Measurement in Education, Chicago, IL.
22. Popham, J., Kingston, N.M., Fremer, J., & Way, D. (April 2015). The importance of instructional sensitivity: A colloquy Among Combatants. Debate at the annual meeting of the National Council for Measurement in Education, Chicago, IL.
23. Kingston, N.M. & Broaddus, A. (March 2015). Learning Maps as the Basis for Educational Assessment. Paper presented at the annual meeting of the Association of Test Publishers, Rancho Mirage, CA.
24. Kingston, N.M. (January 2015). The Dynamic Learning Maps Alternate Assessment System. Paper presented at the annual meeting of the National Association of Private Special Education Centers, New Orleans, LA.

25. Kingston, N.M; Clark, A.K., Pardos, Z; Lee, S.Y. (April 2014). Determining a reasonable starting place for an instructionally embedded dynamic assessment: Heuristic versus Bayesian Network Analysis. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.
26. Clark, A. K. & Kingston, N. M. (April 2014). Comparison of attribute coding procedures for retrofitting cognitive diagnostic models. Poster presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.
27. Zhao, F. & Kingston, N.M. (April 2014). Cognitive Diagnostic Model Comparisons Using Empirical Data. Paper presented at the annual meeting of the National Council for Measurement in Education, Philadelphia, PA.
28. Wang, W. & Kingston, N.M., Michael F. Hock; Gail C. Tiemann; Marcia H. Davis; Stephen M. Tonks (April 2014). Application of the Hierarchical Item Response Model to a Computer Adaptive Test of Graded Response Data. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.
29. Chen, J. & Kingston, N.M. (November 2013). A Comparison of Empirical and Judgmental Approaches for Detecting Instructionally Sensitive Items. Paper presented at the Conference on Instructional Sensitivity, Lawrence, KS.
30. Longabach, T., Chen, J. & Kingston, N.M. (November 2013). Relationship between test item cognitive complexity, content, and instructional sensitivity. Paper presented at the Conference on Instructional Sensitivity, Lawrence, KS.
31. Kingston, N.M. (October 2013). Development of an Assessment for Students with Significant Cognitive Disabilities Based on a Very Large, Fine Grained Learning Map. Paper presented at the 2013 meeting of the International Association for Educational Assessment, Tel Aviv, Israel.
32. Kingston, N.M. & Nitsch, C. (2013) How in the world can an alternate assessment meet the needs of students and parents? Invited presentation at the 2013 Arc National Convention, Seattle, WA.
33. Kingston, N.M. (2013) Tools for Efficiently Enhancing the Validity of Inferences Based on Test Scores: Learning Maps and Technology Enhanced Item Editors. Educational Testing Service, Princeton, NJ.
34. Kingston, N.M. (2013). Learning Models and Learning Analytics. Presented as part of the symposium, "It's not just for online shopping: Using analytics for improved learning and achievement. Invited presentation at the 2013 OSEP Project Directors Meeting.
35. Kingston, N.M. and Tiemann, G.C. (2012). An Exploration of Answer-Changing on a Computer-based High-Stakes Achievement Test: Item View. Paper presented at the Joint Statistical Meeting, San Diego, CA.
36. Tiemann, G.C. and Kingston, N.M. (2012). An Exploration of Answer-Changing on a Computer-based High-Stakes Achievement Test. Paper presented at the Conference on the statistical detection of potential test fraud, Lawrence, KS.
37. Anderson, G. and Kingston, NM. (2012). Providing Useful Information to Guide Student Learning: A Review of State Level Individual Student Reports. Paper presented at the 2012 Annual Convention of the National Council on

Measurement in Education (NCME), Vancouver, Canada.

38. Cho, H. J., & Kingston, N. (April, 2012). Examining the effectiveness of test accommodation using DIF and a mixture IRT Model. Paper presented to annual meeting of the American Education Research Association: Vancouver, Canada.
39. Templin, J., Kingston, N.M., & *Wang, W. (October 2011). Psychometric Issues in Formative Assessment: Measuring Student Learning Throughout the Academic Year Using Interim Assessments. Paper presented at the Maryland Assessment Conference, College Park, MD.
40. Kingston, N.M., Wang, W., *Broaddus, A., & Kramer, L. (August 2011). Kansas Interim Assessment Validity Evidence Based on the Relationship between Interim and Summative Assessment Scores. Paper presented at the annual meeting of the American Psychological Association, Washington, DC.
41. Broadus, A., Kingston, N.M., & Kramer, L. (August 2011). Validity Evidence Based on the Consequences of Interim Assessments. Paper presented at the annual meeting of the American Psychological Association, Washington, DC.
42. Kramer, L. Kingston, N.M., & Broadus, A., (August 2011) Validity Evidence Based on Interim Assessment Content. Paper presented at the annual meeting of the American Psychological Association, Washington, DC.
43. Wang, W., McKinley, R., Kingston, N.M., & Broaddus, A. (August 2011). Validity Evidence Based on the Internal Structure of an Interim Assessment. Paper presented at the annual meeting of the American Psychological Association, Washington, DC.
44. Kingston, N.M. (June 2011). Preparing ALL Students for life, work, and citizenship: The next generation of alternate assessments. Office of Special Education Programs Project Directors' Conference, Washington, DC.
45. Zhao, F. & Kingston, N.M. (April 2011). The Effects of Phonological Awareness on Bilingual/ESL Students' Early Literacy Development. Annual meeting of the American Educational Research Association, New Orleans, LA.
46. Kim, M. & Kingston, N.M. (April 2011). The Efficacy of Curriculum-based measurement: A Meta-Analysis. Annual meeting of the American Educational Research Association, New Orleans, LA.

Selected Professional Service outside the University

Activity	Role	Dates
CCSSO Students with Disabilities Assessment Advisory Task Force	Member	2013
Online Assessment Cross-Consortium Technology Collaboration Group	Member	2013-
GED Technical Advisory Committee	Member	2008-
2015 Conference on Test Security	Chair	2014-2015
2015 International Association for Educational Assessment Conference	Chair	2013-2015

CONDENSED VITA

ANGELA BROADDUS

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EDUCATIONAL EXPERIENCE:

- 2011 Ph.D. Curriculum and Instruction, University of Kansas, Lawrence, KS
1993 M.A.Ed. Curriculum and Instruction, Austin Peay State University, Clarksville, TN
1986 B.S. College of William and Mary, Williamsburg, VA

PROFESSIONAL EXPERIENCE

- 2014-present Mathematics Research Lead, Center for Educational Testing and Evaluation, University of Kansas, Lawrence, KS
2013-2014 Mathematics Research Lead, Dynamic Learning Maps Consortium, University of Kansas, Lawrence, KS
2011-2013 Formative and Interim Assessment Programs Coordinator, Kansas Assessment Program, Center for Educational Testing and Evaluation, University of Kansas, Lawrence, KS
2011-2013 Product Manager for Online Testing Software Application Suite, Center for Educational Testing and Evaluation, University of Kansas, Lawrence, KS
2010-2011 Mathematics Item Development Coordinator, Center for Educational Testing and Evaluation, University of Kansas, Lawrence, KS
2009-2010 Mathematics Curriculum Specialist, Center for Educational Testing and Evaluation, University of Kansas, Lawrence, KS
2009-2010 Adjunct Mathematics Education Instructor, Benedictine College, Atchison, KS
2008-2009 University Supervisor for Teaching Licensure, Curriculum and Teaching Department, School of Education, University of Kansas, Lawrence, KS
2004-2008 Secondary Mathematics Teacher, Atchison High School, Atchison, KS
2001-2004 Secondary Mathematics Teacher, The Fayetteville Academy, Fayetteville, NC
1999-2001 Secondary Mathematics Teacher, Leesville High School, Leesville, LA
1998-1999 Adjunct Mathematics Instructor, Northwestern State University, Fort Polk, LA
1997-1998 Adjunct Mathematics Instructor, Kansas City Kansas Community College, Leavenworth, KS
1992-1994 Adjunct Mathematics Instructor, Austin Peay State University, Clarksville, TN
1986-1990 U.S. Army Commissioned Officer, Fort Bragg, NC

RECENT PUBLICATIONS AND SELECTED RECENT PRESENTATIONS:

Publications

- Broaddus, A., & Sharma, A. (2015, April). *Evaluating a Learning Map of Integer Understanding Using Test Responses*. Presentation at the National Council of Teachers of Mathematics Research Conference, Boston, MA.
- Sharma, A., & Broaddus, A. (2015, April). *Using Bayesian Network Analysis to Validate a Mathematics Learning Map*. Paper presentation at the National Council on Measurement in Education, Chicago, IL.
- Kingston, N., & Broaddus, A. (2015, March). *Learning Maps as a Basis for Educational Assessment*. Presentation at the Innovations in Testing Conference, Palm Springs, CA.

- Broaddus, A., & Gay, A. S. Test Development, Diagnostic Classification, and Evaluating a Cognitive Model of Concepts Foundational to Learning Slope Using the Attribute Hierarchy Method. *International Journal of Testing*. Submitted February 23, 2015.
- Adjei, S., Selent, D., Heffernan, N., Pardos, Z., Broaddus, A., & Kingston, N. (2014, June). Refining Learning Maps with Data Fitting Techniques: Searching for Better Fitting Learning Maps. In J. Stamper, Z. Pardos, M. Mavrikis, & B. M. McLaren (Eds.), *Proceedings of the 7th International Conference on Educational Data Mining* (pp. 413–414). Available at http://educationaldatamining.org/EDM2014/uploads/procs2014/posters/89_EDM-2014-Poster.pdf
- Broaddus, A., Shaftel, J., Conrad, Z., & Esen, A. (2014, April). *Learning maps: Tools for formative assessment practice*. Presentation at the annual meeting of the National Council of Supervisors of Mathematics, New Orleans, LA.
- Broaddus, A., Pardos, Z., Conrad, Z., & Esen, A. (2014, April). *Validation of a mathematics learning map using Bayesian network analysis*. Paper presentation at the annual meeting of the National Council on Measurement in Education, Philadelphia, PA.
- Kingston, N., Erickson, K., Broaddus, A., & Karvonen, M. (2013, July). *Designing validity into the Dynamic Learning Maps (DLM) alternate assessment*. Presentation at the Office of Special Education Programs Project Directors' Conference, Washington, D.C.
- Broaddus, A., & Montgomery, M. (2013, April). Using a cognitive diagnostic model to evaluate and revise a formative assessment. In M. Perie (Chair), *Cognitive Diagnostic Models (II)*. Paper session conducted at the meeting of the National Council on Measurement in Education, San Francisco, CA.
- Broaddus, A., & Shaftel, J. (2012, May). *Cognitive diagnostic assessment: Informing responses and interventions*. Critical discussion presentation at the National Council of Teachers of Mathematics and Council for Exceptional Children Substantive Collaborative Meeting, Reston, VA.
- Thomas, K., Sheinker, A., Broaddus, A., & Sood, P. (2012, April). *Constructing a street level view of the Common Core State Standards: A map for how all students learn mathematics*. Presentation at the annual meeting of the National Council of Supervisors of Mathematics, Philadelphia, PA.
- Broaddus, A. (2012, April). Developing instructional tools to assist teachers in implementing the Common Core State Standards for mathematics. In B. A. Bottge (Chair), *Instructional tools for learning mathematics*. Roundtable session conducted at the meeting of the American Educational Research Association, Vancouver, BC, Canada.
- Broaddus, A. (2012, April). Modeling understanding of foundational concepts related to slope: An application of the attribute hierarchy method. In J. Leighton (Chair), *Cognitive diagnostic assessment: Lessons from practice*. Paper session conducted at the meeting of the National Council on Measurement in Education, Vancouver, BC, Canada.
- Broaddus, A., Kramer, L. M. B., & Kingston, N. (2011, August). Validity evidence based on the consequences of interim assessments. In N. Kingston & A. Broaddus (Chairs), *Interim assessment: Reliability and validity evidence*. Symposium conducted at the meeting of the American Psychological Association, Washington, D.C.
- Kingston, N., Wang, W., Broaddus, A., & Kramer, L. M. B. (2011, August). Validity evidence based on the relationship between interim and summative assessment scores. In N. Kingston & A. Broaddus (Chairs), *Interim assessment: Reliability and validity evidence*. Symposium conducted at the meeting of the American Psychological Association, Washington, D.C.
- Kramer, L. M. B., Kingston, N., & Broaddus, A. E. (2011, August). Validity evidence based on interim assessment content. In N. Kingston & A. E. Broaddus (Chairs), *Interim assessment: Reliability and validity evidence*. Symposium conducted at the meeting of the American Psychological Association, Washington, D.C.

RECENT GRANTS

- Broaddus, A. (PI), & Templin, J. MATH: EAGER – Developing a Learning Map for Introductory Statistics. Submitted to the National Science Foundation, 2015-2017, (\$299,007).
- Hansen, D., Dvorak, M., & Broaddus, A. (Key Staff). *Facilitating Adolescents STEM-Agency Skills Through Cross-Age Science Teaching*. Submitted to the National Science Foundation, 2015-2018, (\$1,998,654).
- Broaddus, A. (PI). *Applying the Dynamic Learning Map to interpret student work within the Writing for Mathematical Reasoning Intervention*. Collaboration with Center for Advanced Technology in Education, University of Oregon, 2014, (\$2,625).
- Kingston, N., Broaddus, A. (Co-PI), & Pardos, Z. *Development of an Application Program Interface to Access the Dynamic Learning Map and Associated Visualization Tools and Demonstrate a Usage Prototype*. Funded by the Bill and Melinda Gates Foundation, 2014-2015, (\$212,022).

James Ross Miller

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Education

- Ph.D., December 1979, Purdue University, Computer Science, Dissertation: *A Computer Graphics System for Macromolecular Model Building*
- M.S., December 1976, Purdue University, Computer Science, Major Areas: Computer Graphics and Languages
- B.S., May 1975, Iowa State University, Computer Science, Graduated With Distinction in Honors Program with Minors in Mathematics, Physics, and German

Professional Experience

- August 1993 - present: Department of Electrical Engineering and Computer Science, The University of Kansas, Lawrence, Kansas
- August 1987 - August 1993: Associate Professor, Department of Computer Science, The University of Kansas, Lawrence, Kansas
- August 1981 - August 1987: Adjunct Professor, Computer Science Department, University of Minnesota, Minneapolis, Minnesota
- February 1980 - August 1987: Senior Consultant, CIM Division, Control Data Corporation, Arden Hills, Minnesota

Selected Recent Refereed Journal Publications

- J. R. Miller, Vector Geometry for Computer Graphics, *IEEE Computer Graphics and Applications*, Vol. 19, No. 3, May/June 1999, pp. 66-73.
- J. R. Miller, Applications of Vector Geometry for Robustness and Speed, *IEEE Computer Graphics and Applications*, Vol. 19, No. 4, July/August 1999, pp. 68-73.
- J. R. Miller and A. L. Melott, Integrating Mathematics and Science Education Using the Powers of Ten, *Journal of Technology and Teacher Education*, Vol. 7, No. 2, 1999, pp. 87-96. (Solicited expanded version of [B.10].)
- D. C. Cliburn, J. J. Feddema, J. R. Miller, and T. A. Slocum, The Design and Evaluation of a Collaborative Decision Support System In a Water Balance Application, *Computers and Graphics*, Vol. 26, No. 6, December 2002, pp. 931-949.
- T. A. Slocum, D. C. Cliburn, J. J. Feddema, and J. R. Miller, Evaluating the Usability of a Tool for Visualizing the Uncertainty of the Future Global Water Balance, *Cartography and Geographic Information Science*, Vol. 30, No. 4, October 2003, pp. 299-317.
- J. R. Miller, Attribute Blocks: A Tool for Visualizing Multiple Continuously-Defined Attributes, *IEEE Computer Graphics & Applications*, Vol. 27, No. 3, May/June 2007, pp. 57-69.
- J. R. Miller, Multivariate Visualization on Parametric Surfaces, *Computer-Aided Design & Applications*, Vol. 5, Nos. 1-4, 2008, pp. 142-152 (published version of [B.20]).
- J. A. Ehrlich and J. R. Miller, A Virtual Environment for Teaching Social Skills: AViSSS, *IEEE Computer Graphics & Applications*, Vol. 29, No. 4, July/August 2009, pp. 10-16. (This paper was highlighted in the August 2009 issue of *Computing Now*, a web site featuring content from the IEEE Computer Society's 13 magazines.)
- J. R. Miller, *freeform*: A Tool for Teaching the Mathematics of Curves and Surfaces, *Computer-Aided Design & Applications*, Vol. 7, No. 2, June 2010, pp. 257-267.

- J. R. Miller, Real-time Visualization of Domain Coverage by Dynamically Moving Sensors, *IEEE Computer Graphics and Applications*, Vol. 32, No. 4, July/August 2012, pp. 8-13.
- E. A. Gavosto and J. R. Miller, Visualization of Data on Unfolded Hypercubes, *Journal of Visualization*, Springer, Vol.16, No. 1, February 2013, pp. 85-94.

Selected Recent Published Refereed Conference Papers

- J. R. Miller, D. C. Cliburn, J. J. Feddema, and T. A. Slocum, Modeling and Visualizing Uncertainty in a Global Water Balance Model, *Proceedings ACM Symposium on Applied Computing (SAC 2003)*, March 9-12, 2003, Melbourne, Florida, pp. 972-978.
- E. L. Meyen and J. R. Miller, A System for Creating and Managing Reusable Learning Objects, *Proceedings of the Sixth IASTED International Conference on Web-Based Education*, March 14-16, 2007, Chamonix, France, pp. 353-358.
- J. R. Miller, *metaview*: A Tool for Learning About Viewing in 3D, *Proceedings ACM SIGCSE*, March 2012, pp. 135-140.
- J. R. Miller, Using a Software Framework to Enhance Online Teaching of Shader-Based OpenGL, *Proceedings ACM SIGCSE*, March 2014, pp. 603-608.

Recent Invited Presentations

- J. R. Miller, Lidar Data Analysis and Visualization, *22nd Annual GIS in Action Conference*, April 16-17, 2014, Portland, Oregon.

Graduate Student Supervision

M.S.: more than 50 as chair; more than 80 as committee member
Ph.D.: 6 as chair; more than 20 as committee member

Major Courses Taught

EECS 168: Programming I (“CS1”)
EECS 268: Programming II (“CS2”)
EECS 368: Programming Language Paradigms
EECS 672: Introduction to Computer Graphics
EECS 690: Object-Oriented Programming
EECS 700: GPGPU Algorithms
EECS 773: Advanced Graphics
EECS 774: Geometric Modeling
EECS 775: Visualization

Major Teaching Tools Developed

- I developed an interactive tool illustrating properties and various construction and editing techniques for a variety of curves and surfaces including Bezier, rational Bezier, and NURBS curves and surfaces. I use this tool regularly in class for my graphics and geometric modeling classes.
- I have developed a tool called *metaview* that I use in my graphics classes to teach how graphics systems define views and view coordinate systems in 3D. For example, it shows a 3D representation of a graphical object along with a representation of the eye coordinate system and view volume, showing the resulting projected image in a separate window. The various objects can be interactively adjusted so that the effects on the view can be immediately seen. The system can be accessed at <http://people.eecs.ku.edu/~miller/Courses/JOGL/metaview.jnlp>.

- The low-level point, vector, and matrix utilities used by both *cryph* and *metaview* have been released as open source tools.

Selected External Professional Activities

- Senior Member, Association for Computing Machinery (ACM)
- Senior Member, IEEE
- Member, ACM SIGGRAPH
- Member, International Program Committee for *CSG '96 - Set Theoretic Solid Modeling: Techniques and Applications*, April 17-19, 1996, Winchester, UK.
- Member, International Program Committee for 1997 *Fourth ACM Symposium on Solid Modeling and Applications*
- Member, International Program Committee for *CSG '98 - Set Theoretic Solid Modeling: Techniques and Applications*, April 1-3, 1998, Winchester, UK.
- Member, International Program Committee for 1999 *Fifth ACM Symposium on Solid Modeling and Applications*

Recent Department Activities

- Chair, PhD Qualifying Exam Committee (1999 – present)
- Chair, ad hoc C.S. Curriculum Review Committee (2004 – 2006)
- Member, EECS Undergraduate Committee (1994 – present)
- Member, Departmental Awards Committee (1999 – present)
- Scheduling Officer (2007 – present)

Recent School & University Activities

- Member, GIS Steering Committee (2003 – present)
- Treasurer, Phi Kappa Phi Scholastic Honorary
- School of Engineering Computer Committee (1999 – 2003; 2015 – present)
- Member University Senate and its Academic Procedures and Policies Committee (1998 – 1999)

Selected Invited Talks

- Lidar Data Analysis and Visualization, *22nd Annual GIS in Action Conference*, April 16-17, 2014, Portland, Oregon.
- Multivariate Visualization and Applications to Uncertainty, invited seminar for Department of Geological and Atmospheric Sciences, Virtual Reality Applications Center, Iowa State University, Ames, Iowa, September 26, 2006.
- Building a Collaborative Visualization Environment, invited seminar for the Kansas Center for Advanced Scientific Computing, January 26, 2001.
- Graphics Applications Programming, Seminar for the Kansas Center for Advanced Scientific Computing, March 6, 1998.
- Science, Technology, and Computers, University of Missouri-Kansas City, November 12, 1995.
- Information Systems, University of Missouri-Kansas City, November 11, 1995.

Service to Community and State

- Board of Directors, The Arc of Douglas County (board member since 1989; Vice President, 1994-1995; President January 1996 - December 1999)
- Board of Directors, The Arc of Kansas (January 1996 - December 1999)

The Arc is an organization that provides advocacy, education, and referral services to individuals with developmental disabilities and their families. It has local (www.arc.lawrence.com), state, and national presence (www.thearc.org/).

- Board of Directors, Lawrence Partnership for Children and Youth (2000-2003)

Honors and Awards

- Boeing A. D. Welliver Faculty Summer Fellowship Awardee, Summer 2004. (Six week on-site program)
- Phi Beta Kappa Scholastic Honorary
- Phi Kappa Phi Scholastic Honorary
- Pi Mu Epsilon mathematics scholastic honorary society.

EDUCATIONAL EXPERIENCE:

- 1970 M.S., Illinois Institute of Technology, Chicago. Major: Product Design
- 1964 M.F.A., University of Kansas, Lawrence. Major: Industrial Design
- 1962 B.F.A., University of Kansas, Lawrence. Major: Industrial Design

DESIGN EDUCATOR AND PROFESSIONAL EXPERIENCE:

- 1978-Present Professor, University of Kansas, Department of Design
Independent business consultant: design, human factors, marketing, design research, interaction design, Web site development, and usability studies and testing
- 1986-1987 IntraUniversity Professor, University of Kansas, School of Architecture and Urban Design
- 1974-1980 Chairman, University of Kansas, Department of Design
- 1974-1978 Associate Professor, University of Kansas, Department of Design
Consulting Partner, Design Planning Group, Inc., Chicago
- 1972-1974 President and Founder, Design Planning Group, Inc., Chicago
- 1969-1972 Director and Founder, Unimark International, Information and Design Systems Division, Chicago
- 1967-1969 Director, Unimark International, Computer Division, Chicago
- 1966-1967 Head, Unimark International, Design Research, Chicago
Instructor and Assistant to Director, Illinois Institute of Technology, Institute of Design, Chicago
- 1965-1966 Junior Designer, Unimark International, Chicago

RECENT PROFESSIONAL WORK:

- 2004-present Micro-Star International, Taipei, Taiwan, ROC, Handheld information appliance interface design
- 2004 Macromedia Corporation, Boston, MA. Design and paper prototyping of a new front-end interface for the 2005 updated release of ColdFusion for Dreamweaver users (enables database-driven dynamic page Websites)
- 2000-present Formative Networks, LLC, Overland Park, KS. Developing user interface models and design strategy for a web-based computer application to be used in the education field
- 2000-2004 VitalSeek, LLC, Kansas City, MO. Developing guidelines for usability and user-interface design
- 2002-2003 IBM Personal Products Division, Member of Marketing Advisory Board,
1999-2002 ImageSeller Inc., Golden, with Mark Feiden).Design planning services developing a strategic planning document and E-commerce web site development

SELECTED PUBLICATIONS AND PRESENTATIONS:

- Branham, R., & Merillat, L., (2005, June). *Human-centered design: Case study for a web repository*. Paper presented at Doctoral Education in Design Conference, Phoenix.
- Branham, R., (2005, May). *New world view for the future of design*. Keynote address presented at Taiwan Annual Design Conference, Institute of Design, Taipei, Taiwan.
- Branham, R., (2005, May). *Experiential learning and interaction design methods*. Paper presented to National Taiwan University of Science and Technology, Department of Industrial and Commercial Design, Taipei, Taiwan.
- Branham, R., (2003 August). *Building dynamic use models for physical and virtual navigation*. Paper presented to Huafan University, Graduate School and Department of Industrial Design, Taipei Hsien, Taiwan.
- Branham, R., (2001, June). *User-centered design and human factors*. Workshop and publication for the User Interface Design Team at Yahoo!, Yahoo! Campus, Sunnyvale, CA.
- Branham, R., (2001, June). *Visual design meets industrial design: Synergy of creative design processes*. Workshop at IBM's "Make it Easy 2001" Conference, San Jose.
- Branham, R., (2000, September). Given the radically changing work environment and new worldviews, what kinds of new 'tools' do designers need to survive and successfully deal with tomorrow's design problems? *The IDSA 2000 National Education Conference Proceedings*, Industrial Designers Society of America, National Conference, University of Southwestern Louisiana, Lafayette.

Awards & Grants:

Teaching-related Awards & Grants while at The University of Kansas

- Burlington Northern Foundation Faculty Achievement Award for outstanding classroom teaching, 1986, \$2500 award. First year awarded at KU.
- H.O.P.E. Award Finalist, selected by KU's Senior Class, 1985
- "Outstanding Educator", Mortar Board Chapter, 1978
- Innovation in Instruction Grant, "Integrating Computers in the Classroom," 1985-1987 (with G. McCleary); \$15,500 for equipment purchase, over three years

Instructional technology fund awards

- With Pok Chi Lau, \$25,000, 2001, "Entry Level to Intermediate Level Digital and Photography Equipment for the Design Department"
- With Jane Wong, \$14,100, 2001, "Computer Equipment for Industrial and Interior Design Programs, Design Department"

Teaching-related grants, outside The University of Kansas

- VersaCad software, 10 copies, Version 5.0, T and W Corporation, Huntington Beach, CA (with C. Kurt, J. Surber) 1987, \$30,000
- AutoSketch Drawing Package, 10 copies, Version 1.0, AutoDesk, Mill Valley, CA (with J. Surber) 1987, \$800
- CADVANCE Drafting System, 3 copies, Version 1.2, Calcomp, Personal Systems Unit, Campbell, CA (with J. Surber) 1986, \$8,400

Consultant 2012
Teacher Education Redesign Initiative, University of Minnesota

I worked with several committees in a Bush Foundation-funded redesign initiative to improve teacher education and licensure programs at the University of Minnesota.

Research Assistant 2006-2008
National Research Center for Career and Technical Education,
University of Minnesota

I was responsible for data management and analysis for a professional development program for high school math teachers and teachers of career and technical education classes. I analyzed qualitative and quantitative data using a variety of descriptive and basic inferential methods and contributed to formal reports for the Center.

Research Assistant 2008
Department of Educational Psychology, University of Minnesota

Contributed to an evaluation study comparing the Educational Psychology Department to comparable programs at other research universities.

Teaching Experience

Instructor. 2009-2012
EDHD 5001 – Learning Cognition and Assessment
College of Education and Human Development, University of Minnesota

Taught both large-lecture and small-discussion sections of an introductory graduate-level educational psychology course for teacher licensure candidates in the College of Education and Human Development at the University of Minnesota. The course focuses on theories of learning and educational assessment. Topics include descriptive statistics, measures of central tendency, ideas of probability, interpreting standardized scores, reliability, and validity. I was responsible for design and delivery of the course, assignments, assessments, design of the course website and supervising 2-4 discussion section graduate teaching assistants.

Instructor 2008, 2010, 2012
EDHD 5001 – Learning Cognition and Assessment
College of Education and Human Development, University of Minnesota

Taught an introductory educational psychology course in the College of Education and Human Development at the University of Minnesota, Crookston. The course was delivered both online and via a live video link between the Twin Cities campus and the students in Crookston, Minnesota.

Teaching Assistant 2005-2009
EDHD 5001 – Learning Cognition and Assessment
College of Education and Human Development, University of Minnesota

Graduate Instructor of a discussion section of “*Learning Cognition & Assessment*,” responsible for facilitating a discussion session of 24-30 students, grading assignments, writing exams, and ensuring that the course aligned with the Minnesota State Standards for Teacher Preparation.

Teaching Assistant 2008, 2010
EPSY 8905 – Landmark Issues in Educational Psychology

Department of Educational Psychology, University of Minnesota

Teaching Assistant for Dr. Scott McConnell for a Ph.D. level, required seminar that focused on history and research methods in educational psychology.

PUBLICATIONS

Lea, R. B., Rapp, D. N., Elfenbein, A., Mitchel, A. D., & Swinburne Romine, R. (2008). Sweet silent thought: Alliteration and resonance in poetry comprehension. *Psychological Science*, 19, 709-716.

Clark, A., Karvonen, M., & Swinburne Romine, R. (2014). Results from external review during the 2013–2014 academic year (Technical Report No. 14-02). Lawrence, KS: University of Kansas, Center for Educational Testing and Evaluation.

PRESENTATIONS

Swinburne Romine, R., & Schuster, J. (2014, April). *Moving beyond learning progressions to dynamic learning maps: A validation study of a Dynamic Learning Map English Language Arts section*. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia, PA.

Swinburne Romine, R., Clark, A. & Karvonen, M. (2015, April) Gathering Evidence of Response Processes for Alternate Assessments (AA-AAS). Paper to be presented at the annual meeting of the National Council on Measurement in Education.

AWARD

University of Minnesota Department of Educational Psychology Graduate Student Teaching Award, May, 2010.

Jonathan G. Schuster
Center for Educational Testing and Evaluation
University of Kansas

Contact Information

Office Address:

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EDUCATION

- Ph. D., Psychology, 2012
Specialty area: Cognitive
University of Kansas, Lawrence, KS.
- M.A., Experimental Psychology, 2006
Specialty area: Cognitive.
Ball State University, Muncie, IN.
- B.A., Psychology, 2004
B.S., Accounting, 2004
Auburn University, Auburn, AL.

PUBLICATIONS

Schuster, J., & Erickson, K. (2014). "Text complexity in the Dynamic Learning Maps Alternate Assessment" (White paper). Dynamic Learning Maps Consortium: Lawrence, KS. <http://dynamiclearningmaps.org/content/dlm-publications>

Atchley, R. A., Ilardi, S., Young, K., Stroupe, N., O'Hare, A., Bistricky, S., Collison, E., Gibson, L., Schuster, J., & Lepping, R. (2012). Depression Reduces Perceptual Sensitivity for Positive Words and Pictures. *Cognition & Emotion*, 26, 1359-1370.

Atchley, R. A., Grimshaw, G., Schuster, J., & Gibson, L. (2011). Examining lateralized lexical ambiguity processing using dichotic and cross-modal tasks. *Neuropsychologia*, 49, 1044-1051.

Ritchey, K., Schuster, J., & Allen, J. (2008). How the relationship between text and headings influence readers' memory. *Contemporary Educational Psychology*, 33, 859-874.

ACCEPTED FOR PUBLICATION

Whetstone, P. J., Gillmor, S. C., & Schuster, J. Effects of a meta-cognitive social skill intervention in a rural setting with at-risk adolescents. *Rural Special Education Quarterly*.

PUBLICATIONS IN PREPARATION

Swinburne Romine, R., & Schuster, J. Increasing text accessibility by adjusting text complexity to meet student needs.

RESEARCH PRESENTATIONS

Swinburne Romine, R., & Schuster, J. (2014). Moving beyond learning progressions to dynamic learning maps: A validation study. Roundtable discussion at the American Educational Research Association annual meeting, Philadelphia, PA.

Whetstone, P., Schuster, J., & Gillmor, S. (2013). Social skills change student behavior. Lecture presented at the Learning Disabilities Association of America Conference, San Antonio, TX.

Schuster, J. G., Clark, A. K., Mark, C. A., & Shin, S. (2012). Multiple pathways to literacy: The Dynamic Learning Maps Alternate Assessment System. Lecture presented at the Council for Exceptional Children Convention and Expo, Denver, CO.

Atchley, R. A., Azevedo, N., Schuster, J., & Kehayia, E. (2012). Using electrophysiological measures to study lexicality judgments. Poster presented at the 20th annual meeting of the Cognitive Neuroscience Society, Chicago, IL.

Lepping, R., Atchley, R. A., Stroupe, N., Young, K., Gibson, L., & Schuster, J. (2010). Emotional sentence processing in major depressive disorder. Poster presented at the 51st annual meeting of the Psychonomic Society, St. Louis, MO.

Landau, M. J., Atchley, R. A., Vess, M., Arndt, J., Rothschild, Z., Sullivan, D., Young, K., O'Hare, A., Gibson, L., & Schuster, J. (2009). Semantically instantiated \ conceptual metaphors influence expressions of the intrinsic self-concept. Poster presented at the 50th annual meeting of the Psychonomic Society, Boston, MA.

Schuster, J., Atchley, R. A., Grimshaw, G., Gibson, L., Williams, C., & Menager, J. (June, 2009). Lateralized meaning access for lexically ambiguous auditory stimuli. Poster presented at the annual meeting of Theoretical and Experimental Neuropsychology, Montreal, Quebec, Canada.

Schuster, J., & Atchley, R. A. (October, 2008). Influence of reading goals and working memory span on reading. Poster presented at the sixth international Conference of the Mental Lexicon, Banff, Alberta, Canada.

Schuster, J., & Atchley, R. A. (November, 2007). Influence of reading goals and working memory span on reading and recall. Poster presented at the 48th annual meeting of the Psychonomic Society, Long Beach, CA.

RESEARCH EXPERIENCE

2013-Present Research Associate on for the *Dynamic Learning Maps Alternate Assessment Consortium* in the Center for Educational Testing and Evaluation at the University of Kansas. Responsible for the development and content of the English language arts section of the Learning Map, for the communication with the Human Subjects Committee, Lawrence Campus at KU to ensure all research has been approved for use, and for providing assistance to the test development team in preparation for a test release or standard setting meeting.
<http://dynamiclearningmaps.org/>

2013-2014 Product Manager of the Learning Map application for the *Dynamic Learning Maps Alternate Assessment Consortium* in the Center for Educational Testing and Evaluation at the University of Kansas. Responsible for the maintenance and improvement of the learning map application by creating ways of improving it to meet user needs and to represent the information efficiently and clearly.
<http://dynamiclearningmaps.org/>

2012-2013 Postdoctoral Researcher on the *Dynamic Learning Maps Alternate Assessment Consortium* in the Center for Educational Testing and Evaluation at the University of Kansas. Conducting research on the validity of the pathways in the learning map for students with significant cognitive disabilities and on the usefulness of adjusting text complexity on student performance.
<http://dynamiclearningmaps.org/>

2011-2012 Graduate Research Assistant on the *Dynamic Learning Maps Alternate Assessment Consortium* in the Center for Educational Testing and Evaluation at the University of Kansas. Helped create and edit the learning map for English Language Arts.
<http://dynamiclearningmaps.org/>

COLLEGE TEACHING EXPERIENCE

Summer 2008	Assistant Instructor Research Methods (PSYC 310) 1 Section University of Kansas.
2007-2009	Assistant Instructor General Psychology (PSYC 104) 8 sections University of Kansas.

KIMBERLY D. GOOD
Managing Evaluator
McREL International – Charleston/Nashville

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EDUCATION

Ph.D. (educational leadership), Western Michigan University, Kalamazoo, MI, 1997
M.A. (educational psychology), University of South Dakota, Vermillion, SD, 1994
B.A. (science education), University of Northern Iowa, Cedar Falls, IA, 1990

SPECIFIC AREAS OF EXPERTISE

- ◆ Program evaluation
- ◆ Methods for evaluating programs (e.g., quasi-experimental methodology)
- ◆ Methods for data collection aligned with evaluation methods and questions, including interviews, focus groups, surveys, and observations
- ◆ Strategies for organizing and managing data
- ◆ Methods for analyzing data to explore findings and respond to evaluation questions, including qualitative coding and analyses, descriptive and comparative statistics, and regression analyses
- ◆ New business development
- ◆ Cognitive Coaching
- ◆ Concerns-Based Adoption Model
- ◆ Certification at the 2011 Summer Institute on Cluster Randomized Trials sponsored by the Institute of Education Science
- ◆ Certification at the 2007 Quasi-Experimental Design and Analysis Workshop sponsored by Northwestern University and The Spencer Foundation

PROFESSIONAL EXPERIENCE

2013-present **Managing Evaluator**

McREL International, Charleston, WV

Assist the Charleston-Nashville Center Executive Director of Evaluation Services in providing leadership of the center, developing center business plan, securing center revenue targets, and overseeing all center evaluation projects. Conceptualize designs and budgets for and manage evaluation projects. Collect and conduct analysis of quantitative and qualitative data, summarize data, prepare written deliverables, and present findings at national conferences.

2003-2013 **Senior Research and Evaluation Specialist, Research and Evaluation Specialist I and II**

Edvantia (formerly Appalachia Educational Laboratory), Charleston, WV

Conceptualized designs for and conducted evaluation projects. Collected quantitative and qualitative data. Developed/maintained databases and

conducted statistical analyses. Summarized data and wrote evaluation reports, quarterly/annual reports, and technical papers. Developed papers and presented at national conferences.

- 2001–2002 **Director, Sponsored and Academic Program Support and Evaluation**
Saginaw Valley State University, University Center, MI
Oversaw the submission of faculty and staff proposals for external funding. Provided support in finding funding sources appropriate to proposed ideas, assisted in the development of proposals, and delivered workshops on proposal development. Administered the general education program assessment plan. Collected, analyzed and reported on student assessment data. Coordinated the university-wide academic assessment plan. Facilitated the development and implementation of departmental assessment plans. Served on the university's North Central Association Steering Committee and Editorial Board.
- 1996–2001 **Evaluation Associate**
North Central Regional Educational Laboratory, Naperville, IL
Project manager for several internal and external federally and state-funded program evaluations. Responsibilities included designing and implementing evaluation plans, instrumentation development, data collection and analysis, and report writing and presenting. Provided ongoing, sustained technical assistance to a state education agency on the redesign of accreditation process for local education agencies and intermediate unit agencies. Served as a team member for many other evaluation projects especially projects involving the integration of technology into teaching and learning.
- 1994–1996 **Research Associate**
The Evaluation Center, Western Michigan University, Kalamazoo, MI.
Member of the external evaluation teams for several multi-year evaluation contracts funded by state department of educations and foundations. Involved in numerous activities including survey design and analysis, site visits, technical report writing, evaluation planning, observation and documentation, constructing databases and utilizing the Internet for input evaluation.
- 1993–1994 **Teacher**
Belvidere Community School District, Belvidere, IL
Taught six sections of secondary earth science. Assisted in the development of outcomes, objectives, and assessments for science curriculum as part of the Illinois School Improvement Plan.
- 1992–1993 **Research Assistant, Office of the Dean, School of Education**
University of South Dakota, Vermillion, SD
Compiled and reviewed NCATE reports as well as handled daily office operations.

- 1991–1992 **Graduate Assistant for the Center for Interactive Technology in Education and Corporations**
University of South Dakota, Vermillion, SD
Assisted in the editing and production of educational videotapes.
- 1990-1991 **Teacher**
Lyons-Decatur Community School District, Lyons, NE
Taught half-time three sections of seventh grade science and two sections of secondary journalism. Was the faculty advisor of the yearbook and junior high girls track coach.

SELECTED PROJECT EXPERIENCE

The OrtHotics, PrOsthetics & PEdorthics (HOPE) Careers Consortium TAACCCT evaluation (2013 - present)

Client: Century College, MN

Managing a U.S. Department of Labor Trade Adjustment Assistance Community College and Career Training (TAACCCT) evaluation study of Century College's HOPE project using a mixed-method, quasi-experimental, cohort-based longitudinal design with matched comparisons.

Comprehensive Center evaluation projects (2005 - current)

Client: Edvantia, Educational Testing Service

Managed the evaluation of Edvantia's Appalachia Regional Comprehensive Center (ARCC) and Educational Testing Service's Florida and the Islands Comprehensive Center (FLICC). Oversaw design and implementation of evaluation plans for state and regional initiatives and attended to federal reporting requirements; member of the ARCC Leadership Team; co-developed ARCC Suite of Technical Assistance Tools and wrote informational briefs.

Enhanced Assessment Grant evaluation projects (various periods from 2010 – current)

Clients: Pacific Metrics, University of Kansas, University of Wisconsin-Madison,

Conceptualized and wrote evaluation plans for and managed three Enhanced Assessment Grant projects for which clients receiving funding by the U.S. Department of Education. Mixed method evaluation employed that included artifacts and project documentation review, key project staff interviews, and an expert review.

The Library of Virginia's Summer Reading Program Evaluation Study (2013 – current)

Client: The Library of Virginia

Managing a three-year evaluation to study the impact of the 2013 Summer Reading Program (SRP) offered by the Virginia Public Libraries, on children and teens and, to a lesser extent, young children (i.e., preschool age and below) who participate. The evaluation uses a quasi-experimental design to document and explore reading achievement and outcomes for participants and nonparticipants.

Oklahoma Commission on Teacher Preparation (OCTP) Professional Development Institutes evaluation (2005 – 2007)

Client: OCTP

Partnered with the Oklahoma Technical Assistance Center to evaluate the OCTP's PDIs. Implemented an evaluation to assess the effectiveness of the PDIs in terms of changes in teachers' knowledge, skills, and instructional practices, and in turn, the impact on student learning and achievement. Used a multi-method approach guided by Guskey's professional development evaluation framework. Data collection methods included observations of the PDI sessions, participant (teacher) and trainer interviews, PDI session evaluation data, teacher pre- and post-tests and student achievement data.

Saxon Grade K-3 Quasi-experimental Research Study (2005 – 2006)

Client: Harcourt Achieve

Conducted a randomized effectiveness evaluation of the Saxon Math Program in Grades K-3 to determine its effects on children's mathematics performance. The quasi-experimental research design which included several measures to assess teacher implementation of the Saxon Math Program and student outcomes including The Stanford Achievement Test, Ninth Edition (SAT 9); records of Saxon Math student assessment data for participating students at three points throughout the school year (beginning, middle, and end); levels of use telephone interviews; videotaped classroom lessons; and a teacher implementation survey. A total of 33 experimental and 24 comparison schools across 16 states participated in the study.

PUBLICATIONS

Hawkes, M. and Good, K. (2000). Evaluating professional development outcomes of a telecollaborative technology curriculum. *The rural educator*, 21(3), 5-11.

PROFESSIONAL AFFILIATIONS

- ◆ American Evaluation Association, including Topical Interest Groups:
 - Evaluation Managers and Supervisors
 - Evaluation Use
 - Integrating Technology Into Evaluation
 - Organizational Learning and Evaluation Capacity Building
 - STEM Education and Training

**Interstate Agreement between Kansas and
Participating Consortium States**

**Enhanced Assessment Grants Program, CFDA 84.368A
Use of Learning Maps as an Organizing Structure for Formative Assessment**

The State of Kansas and the consortium states ("States") hereby consent and agree to the following:

I. Purpose

The States (listed below) are entering into this Agreement to determine how to advance student achievement through defining and evaluating best practices in using learning maps as an organizing structure for effective formative assessment.

II. Lead State Duties

The State of Kansas is the Lead State in this consortium and as such will file the grant application and act as fiscal agent as provided in paragraph IV.

III. State Obligations

All States certify and attest that they agree to follow all applicable rules, laws, and policies as required under the assurances made upon applying for the Enhanced Assessment Grant, CFDA 84.368A.

The States agree to carry out all activities as they are described in the grant application.

IV. Funds Accountability

The States agree to utilize funds in accordance with Federal regulations applicable under the grant. No state shall be required to contribute funds to another participant state and each state is solely responsible for its financial obligations under the grant.

Each agency shall maintain fiscal records necessary for full accountability, follow generally accepted accounting principles, and account for all receipts and disbursements of funds transferred or expended pursuant to this Agreement.

The State of Kansas shall act as fiscal agent on the grant and disburse funds based on the terms of the grant and invoices received from the participating States. Should funding for the grant be reduced, Kansas will prorate reimbursements to the participating States. No funds will be dispersed to a state without a written invoice from the State.

Payment shall be made within a reasonable time after requests for payment and supporting documentation have been received by Kansas.

At the end of the grant period, the States must ensure that each has submitted all documentation of expenses to Kansas as the fiscal agent.

V. Sufficient Funding

The States understand and agree that because the Lead State is a governmental entity, this MOU shall in no way bind or obligate the State of Kansas beyond the terms of the Grant Award appropriation of funds by the United States Department of Education. Kansas reserves the right to

terminate the MOU, in whole or in part, if the U. S. Department of Education does not appropriate sufficient funds as may be required for Kansas to continue payment of funds to the participating states, or if the U. S. Department of Education requires Kansas to return funds to the federal government. Kansas may also terminate this MOU if the executive branch of the U. S. Department of Education mandates any cuts in or holdbacks of funding. Kansas may terminate under this provision by providing the States with 30 days written notice of termination.

VI. No Authority to Bind Other States

One State under this Agreement shall have no authority to enter into contracts or agreements on behalf of the other States. All contracts or agreements shall be entered on behalf of the executing State or executed by all participating States. No third party or other State entity may rely on this MOU. Any failure of the participating States to follow any or all of the terms of the MOU or Grant, or any future amendment or modification of the Grant, shall not establish any liability of the individual States to any third party or other entity.

VII. Limitations

This MOU does not create or give the participating States any powers that they would otherwise not have. Rather, this MOU is only to provide for the exercise of existing powers so as to achieve a more efficient operation of government. For this reason, this MOU sets forth the understanding of the States in achieving a common purpose, and is not intended to provide a basis for legal action upon breach of any of its provisions.

VIII. Period of Performance

The period of performance of this agreement shall be a period of twenty-four (24) months, and shall commence upon date of award.

IX. Copyright

Copyright to all materials developed for this project will be property of the Kansas University Center for Research. All state and territory departments of education will have a nontransferable right to non-commercial use of any product or deliverable resulting from this project.

X. Termination

Any party to this agreement may, without cause, terminate this agreement by notifying the others in writing at least 30 calendar days prior to intended date of terminate.

In the event that federal or state laws are amended or judicially interpreted so as to render the fulfillment of the agreement unnecessary or impractical as a result of such amendments or judicial interpretation, all parties to this agreement shall be discharged from further obligations under its terms, except of the completion of work commenced

prior to the date of termination and the equitable settlement of compensation due for such work.

XI. Amendment

This agreement shall not be altered, changed or amended except by an instrument in writing executed by the parties hereto.

XII. Scope of Agreement

This agreement incorporates all the agreements, covenants, and understandings between the parties of this agreement concerning the subject matter hereof. No prior agreement or understanding, verbal or otherwise, of parties or their agents shall be valid or enforceable unless embodied in this agreement.

XII. Dispute Resolution

Any disputes arising out of work performed and/or products or services delivered under this agreement will be subject to the laws of the State of Kansas and the United States.

XIV. Authority

In signing this Agreement on behalf of my state, I certify that:

1. I am authorized to do so;
2. This Agreement does not conflict with any applicable law or regulation to which my state is subject;
3. This document may be executed in counterparts.

State of Kansas

Consortium State 1

(b)(6)

Alaska

Authorized agent
Scott E. Smith, Director
Careers, Standards & Assessments
/Research & Evaluation

Date 6/26/2015

(b)(6)

Authorized agent
Margaret MacKinnon, Director, Assessment & Accountability

Date June 24, 2015

**Interstate Agreement between Kansas and
Participating Consortium States**

**Enhanced Assessment Grants Program, CFDA 84.368A
Use of Learning Maps as an Organizing Structure for Formative Assessment**

The State of Kansas and the consortium states ("States") hereby consent and agree to the following:

I. Purpose

The States (listed below) are entering into this Agreement to determine how to advance student achievement through defining and evaluating best practices in using learning maps as an organizing structure for effective formative assessment.

II. Lead State Duties

The State of Kansas is the Lead State in this consortium and as such will file the grant application and act as fiscal agent as provided in paragraph IV.

III. State Obligations

All States certify and attest that they agree to follow all applicable rules, laws, and policies as required under the assurances made upon applying for the Enhanced Assessment Grant, CFDA 84.368A.

The States agree to carry out all activities as they are described in the grant application.

IV. Funds Accountability

The States agree to utilize funds in accordance with Federal regulations applicable under the grant. No state shall be required to contribute funds to another participant state and each state is solely responsible for its financial obligations under the grant.

Each agency shall maintain fiscal records necessary for full accountability, follow generally accepted accounting principles, and account for all receipts and disbursements of funds transferred or expended pursuant to this Agreement.

The State of Kansas shall act as fiscal agent on the grant and disburse funds based on the terms of the grant and invoices received from the participating States. Should funding for the grant be reduced, Kansas will prorate reimbursements to the participating States. No funds will be dispersed to a state without a written invoice from the State.

Payment shall be made within a reasonable time after requests for payment and supporting documentation have been received by Kansas.

At the end of the grant period, the States must ensure that each has submitted all documentation of expenses to Kansas as the fiscal agent.

V. Sufficient Funding

The States understand and agree that because the Lead State is a governmental entity, this MOU shall in no way bind or obligate the State of Kansas beyond the terms of the Grant Award appropriation of funds by the United States Department of Education. Kansas reserves the right to terminate the MOU, in whole or in part, if the U. S. Department of Education does not appropriate sufficient funds as may be required for Kansas to continue payment of funds to the participating states, or if the U. S. Department of Education requires Kansas to return funds to the federal government. Kansas may also terminate this MOU if the executive branch of the U. S. Department of Education mandates any cuts in or holdbacks of funding. Kansas may terminate under this provision by providing the States with 30 days written notice of termination.

VI. No Authority to Bind Other States

One State under this Agreement shall have no authority to enter into contracts or agreements on behalf of the other States. All contracts or agreements shall be entered on behalf of the executing State or executed by all participating States. No third party or other State entity may rely on this MOU. Any failure of the participating States to follow any or all of the terms of the MOU or Grant, or any future amendment or modification of the Grant, shall not establish any liability of the individual States to any third party or other entity.

VII. Limitations

This MOU does not create or give the participating States any powers that they would otherwise not have. Rather, this MOU is only to provide for the exercise of existing powers so as to achieve a more efficient operation of government. For this reason, this MOU sets forth the understanding of the States in achieving a common purpose, and is not intended to provide a basis for legal action upon breach of any of its provisions.

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1. I am authorized to do so;
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3. This document may be executed in counterparts.

State of Kansas

Consortium State of Missouri

(b)(6)

June 25, 2015

Authorized agent/Date *6/26/2015*

Sharon Helwig, Ph.D.
Assistant Commissioner

Scott E. Smith, Director
Careers, Standards & Assessments/Research & Evaluation

**Interstate Agreement between Kansas and
Participating Consortium States**

**Enhanced Assessment Grants Program, CFDA 84.368A
Use of Learning Maps as an Organizing Structure for Formative Assessment**

The State of Kansas and the consortium states ("States") hereby consent and agree to the following:

I. Purpose

The States (listed below) are entering into this Agreement to determine how to advance student achievement through defining and evaluating best practices in using learning maps as an organizing structure for effective formative assessment.

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The States agree to carry out all activities as they are described in the grant application.

IV. Funds Accountability

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3. This document may be executed in counterparts.

State of Kansas

Consortium State 1

State name: Iowa

(b)(6)

Authorized agent

Authorized agent: Jeff Berger, CFO, Iowa Department of Education

Scott E. Smith, Director

Careers, Standards & Assessments/Research & Evaluation

Date 6/26/2015

Date 6/25/2015

**Interstate Agreement between Kansas and
Participating Consortium States**

**Enhanced Assessment Grants Program, CFDA 84.368A
Use of Learning Maps as an Organizing Structure for Formative Assessment**

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2. This Agreement does not conflict with any applicable law or regulation to which my state is subject;
3. This document may be executed in counterparts.

State of Kansas

Consortium State 1

State name

(b)(6)	
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Authorized agent

Authorized agent

Date 6/29/15

Date 6-29-15

Scott E. Smith, Director
Careers, Standards & Assessments
/Research & Evaluation

**Suzanne Linton, Director
Management Services**



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

**Department of Education
& Early Development**

DIVISION OF TEACHING & LEARNING SUPPORT
Assessment and Accountability

801 West 10th Street, Suite 303
P.O. Box 110500
Juneau, Alaska 99811-0500
Phone: 907.465.2970
Fax: 907.465.8400

June 17, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

Dear Dr. Smith

The Alaska State Department of Education & Early Development is excited to support and participate as a member of the Kansas State Department of Education's consortium in an application for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*. Members of our departments responsible for formative assessment and instructional support services strongly support the Kansas State Department of Education and the funding of this application to enhance the quality of assessment instruments and systems used by States for measuring the learning and achievement of all students.

Additionally, we are excited to partner with the Center for Educational Testing and Evaluation at the University of Kansas on this project. The Center for Educational Testing and Evaluation offers strong management, superb professionalism, excellent technical abilities, and thorough understanding of the needs of educators and learners. The Center for Educational Testing and Evaluation's proven ability to initiate and complete projects of this magnitude gives us complete confidence that the project's goals will be met.

Alaska understands that copyright to Learning Maps, professional development materials, classroom activities, formative assessments, or other supporting documents developed for this project will be held by the University of Kansas Center for Research, but that all state departments of education and common assessment consortia acting on behalf of state departments of education will have license in perpetuity to use these materials.

To further support the Kansas State Department of Education as designated applicant, Alaska will actively participate in the governance of this grant in order to develop consensus around the final professional development, instructional information, formative assessments, and other materials produced under this grant. Alaska will help identify teachers and encourage participation as necessary for the success of this project.

Sincerely,

(b)(6)

Margaret MacKinnon
Director, Assessment and Accountability

June 19, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

Dear Dr. Smith,

The Missouri State Department of Education is excited to support and participate as a member of the Kansas State Department of Education's consortium in an application for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*. Members of our departments responsible for formative assessment and instructional support services strongly support the Kansas State Department of Education and the funding of this application to enhance the quality of assessment instruments and systems used by States for measuring the learning and achievement of all students.

Additionally, we are excited to partner with the Center for Educational Testing and Evaluation at the University of Kansas on this project. The Center for Educational Testing and Evaluation offers strong management, superb professionalism, excellent technical abilities, and thorough understanding of the needs of educators and learners. The Center for Educational Testing and Evaluation's proven ability to initiate and complete projects of this magnitude gives us complete confidence that the project's goals will be met.

Missouri understands that copyright to Learning Maps, professional development materials, classroom activities, formative assessments, or other supporting documents developed for this project will be held by the University of Kansas Center for Research, but that all state departments of education and common assessment consortia acting on behalf of state departments of education will have license in perpetuity to use these materials.

To further support the Kansas State Department of Education as designated applicant, Missouri will actively participate in the governance of this grant in order to develop consensus around the final professional development, instructional information, formative assessments, and other materials produced under this grant. Missouri will help identify teachers and encourage participation as necessary for the success of this project.

Sincerely,

(b)(6)

Sharon Helwig, Ph.D.
Assistant Commissioner

June 17, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

Dear Dr. Smith,

The Wisconsin Department of Public Instruction supports and is willing to participate as a member of the Kansas State Department of Education's consortium in an application for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*.

Wisconsin understands that copyright to Learning Maps, professional development materials, classroom activities, formative assessments, or other supporting documents developed for this project will be held by the University of Kansas Center for Research, but that all state departments of education and common assessment consortia acting on behalf of state departments of education will have license in perpetuity to use these materials.

To further support the Kansas State Department of Education as designated applicant, Wisconsin will actively participate in the governance of this grant in order to develop consensus around the final professional development, instructional information, formative assessments, and other materials produced under this grant. Wisconsin will help identify teachers and encourage participation as necessary for the success of this project.

Sincerely,

(b)(6)





STATE OF IOWA

TERRY BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF EDUCATION
BRAD A. BUCK, DIRECTOR

June 24, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, KS 66612-1212

Dear Dr. Smith:

The Iowa State Department of Education is excited to support and participate as a member of the Kansas State Department of Education's consortium in an application for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*. Members of our departments responsible for formative assessment and instructional support services strongly support the Kansas State Department of Education and the funding of this application to enhance the quality of assessment instruments and systems used by States for measuring the learning and achievement of all students.

Additionally, we are excited to partner with the Center for Educational Testing and Evaluation at the University of Kansas on this project. The Center for Educational Testing and Evaluation offers strong management, superb professionalism, excellent technical abilities, and thorough understanding of the needs of educators and learners. The Center for Educational Testing and Evaluation's proven ability to initiate and complete projects of this magnitude gives us complete confidence that the project's goals will be met.

Iowa understands that copyright to Learning Maps, professional development materials, classroom activities, formative assessments, or other supporting documents developed for this project will be held by the University of Kansas Center for Research, but that all state departments of education and common assessment consortia acting on behalf of state departments of education will have license in perpetuity to use these materials.

To further support the Kansas State Department of Education as designated applicant, Iowa will actively participate in the governance of this grant in order to develop consensus around the final professional development, instructional information, formative assessments, and other materials produced under this grant. Iowa will help identify teachers and encourage participation as necessary for the success of this project.

Sincerely,

(b)(6)

W. David Tilly
Deputy Director

Cc: Emily Thatcher

Grimes State Office Building - 400 E 14th St - Des Moines IA 50319-0146

PHONE (515) 281-5294 FAX (515) 242-5988

www.educateiowa.gov

Championing Excellence for all Iowa Students through Leadership and Service



June 26, 2015

Dr. Randall D. Watson, Commissioner of Education
Kansas State Department of Education
900 SW Jackson Street, Suite 600
Topeka, Kansas 66612-1212

Dear Dr. Watson,

The University of Kansas Center for Research, Inc. has reviewed and approved the proposed research collaboration for the project entitled "Use of Learning Maps as an Organizing Structure for Formative Assessment" submitted under the direction of Dr. Neal Kingston to the Kansas State Department of Education. It is our understanding that the Kansas State Department of Education will be submitting a proposal to the U.S. Department of Education's Enhanced Assessment Instruments Grant Program. The budget reflects a total request of \$5,677,983.00 for the project duration of 10/01/2015-09/30/2019.

The University of Kansas Center for Research, Inc. is a non-profit organization affiliated with the University of Kansas, and handles the administrative and financial functions of research projects for the university.

By signing this letter, KUCR's authorized representative, Kristi M. Billinger, is demonstrating commitment to the proposed research collaboration.

Should this proposal be approved, please direct all payments to the following address:

University of Kansas Center for Research, Inc.
Accounting Services
2385 Irving Hill Road
Lawrence, KS 66045-7568

EIN: 48-0680117

Please contact our office if you need any additional information. Thank you for your attention to this matter.

Sincerely,

(b)(6)

Kristi M. Billinger
Director, Research Administration

June 18, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

Dear Dr. Smith

I welcome the opportunity to support and participate as an advisor for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*. I wholeheartedly support the consortium's effort to develop professional development modules and instructional supports that will support teachers in conducting formative assessment in the service of personalized instruction. I am confident that funding this application will result in enhancing the quality of assessment instruments and systems used by consortium states for measuring the learning and achievement of all students.

As a member of the advisory panel I can provide assistance in a variety of ways. I have more than 30 years of experience in mathematics education ranging from elementary classroom teaching to national leadership serving on the Board of Directors of the National Council of Teachers of Mathematics and as President of the Association of Mathematics Teacher Educators. I continue to work in classrooms to support teachers in their mathematics instruction and can bring a comprehensive perspective to the project. Much of my work is using formative assessment tools at the intersection of mathematics education and special education.

Additionally, I am excited to partner with the Center for Educational Testing and Evaluation (CETE) at the University of Kansas on this project. CETE offers strong management, superb professionalism, excellent technical abilities, and thorough understanding of the needs of educators and learners. CETE's proven ability to initiate and complete projects of this magnitude gives me complete confidence that the project's goals will be met.

I understand my commitment to serve on the advisory board includes my participation in one face-to-face meeting per year plus up to four scheduled conference calls per year for each of the four project years. I am pleased to offer my expertise to assist in guiding and developing consensus around the final professional development, instructional information, formative assessments, and other materials produced under this grant.

Sincerely,

(b)(6)

Karen Karp
Distinguished Teaching Professor

The University of Kansas

Department of Educational Psychology

Advisory Board Member Letterhead

June 21, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

Dear Dr. Smith

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Sincerely,

(b)(6)

Bruce Frey, Ph.D.
Associate Professor, Educational Psychology
643 JR Pearson Hall
785-864-9706

Heritage Consulting, Inc
227 Tilden Avenue
Los Angeles
CA 90049

June 18, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

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I welcome the opportunity to support and participate as an advisor for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*. I wholeheartedly support the consortium’s effort to develop professional development modules and instructional supports that will support teachers in conducting formative assessment in the service of personalized instruction. I am confident that funding this application will result in enhancing the quality of assessment instruments and systems used by consortium states for measuring the learning and achievement of all students.

Additionally, I am excited to partner with the Center for Educational Testing and Evaluation (CETE) at the University of Kansas on this project. CETE offers strong management, superb professionalism, excellent technical abilities, and thorough understanding of the needs of educators and learners. CETE’s proven ability to initiate and complete projects of this magnitude gives me complete confidence that the project’s goals will be met.

I understand my commitment to serve on the advisory board includes my participation in one face-to-face meeting per year plus up to four scheduled conference calls per year for each of the four project years. I am pleased to offer my expertise to assist in guiding and developing consensus around the final professional development, instructional information, formative assessments, and other materials produced under this grant.

Sincerely,

(b)(6)

A rectangular box with a black border, containing the text "(b)(6)" in the top-left corner. The rest of the box is empty, indicating that the signature has been redacted.

Margaret Heritage
Consultant

Instructional Research Group

June 18, 2015

Dr. Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

Dear Dr. Smith,

I welcome the opportunity to support and participate as an advisor for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*. I wholeheartedly support the consortium's effort to develop professional development modules and instructional supports that will support teachers in conducting formative assessment in the service of personalized instruction. I am confident that funding this application will result in enhancing the quality of assessment instruments and systems used by consortium states for measuring the learning and achievement of all students.

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Formative assessment is a critical "hot topic" right now. However, many of these assessments lack any type of validity or reliability data and often are quite vague on instructional implications. Thus your project is potentially a very important one.

I understand my commitment to serve on the advisory board includes my participation in one face-to-face meeting per year plus up to four scheduled conference calls per year for each of the four project years. I am pleased to offer my expertise to assist in guiding and developing consensus around the final professional development, instructional information, formative assessments, and other materials produced under this grant.

(b)(6)

Professor Emeritus, College of Education, University of Oregon
and Director, Instructional Research Group, Los Alamitos, California



June 18, 2015

Scott Smith
Director, Career, Standards and Assessment Services
Kansas State Department of Education
Landon State Office Building
900 SW Jackson Street
Topeka, Kansas 66612-1212

Dear Dr. Smith

I welcome the opportunity to support and participate as an advisor for the Enhanced Assessment Instruments Grant (CFDA 84.368A) – *Use of Learning Maps as an Organizing Structure for Formative Assessment*. I wholeheartedly support the consortium’s effort to develop professional development modules and instructional supports that will support teachers in conducting formative assessment in the service of personalized instruction. I am confident that funding this application will result in enhancing the quality of assessment instruments and systems used by consortium states for measuring the learning and achievement of all students.

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Sincerely,

(b)(6)

Barbara A. Bradley, Ph.D.
Associate Professor, Reading Education
barbarab@ku.edu

References

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INDIRECT COST RATE AGREEMENT
STATE EDUCATION AGENCY

Organization

Kansas Department of Education
120 SE 10th Avenue
Topeka, KS 66612-1182

Date: JUN 23 2015**Agreement No:** 2015-027**Filing Reference:** Replaces previous
Agreement No. 2012-056**Dated:** 9/14/2012

The approved indirect cost rates herein are for use on grants, contracts, and other agreements with the Federal Government. The rates are subject to the conditions included in Section II of this Agreement and issued by the U.S. Department of Education pursuant to the authority in Attachment A of Office of Management and Budget Circular A-87.

Indirect rates for fiscal years that begin on or after December 26, 2014 are subject to 2 CFR Part 200.

Section I - Rates and Bases

<u>Type</u>	<u>From</u>	<u>To</u>	<u>Rate</u>	<u>Base</u>	<u>Applicable To</u>
Predetermined	07/01/2012	06/30/2015	17.6%	MTDC	Unrestricted
Predetermined	07/01/2012	06/30/2015	12.6%	MTDC	Restricted
Predetermined	07/01/2015	06/30/2018	20.8%	MTDC	Unrestricted
Predetermined	07/01/2015	06/30/2018	13.7%	MTDC	Restricted

Distribution Base:

MTDC Modified Total Direct Cost - Total direct costs excluding equipment, capital expenditures, participant support costs, pass-through funds and the portion of each subaward (subcontract or subgrant) above \$25,000 (each award; each year).

Applicable To:

Unrestricted Unrestricted rates apply to programs that do not require a restricted rate per 34 CFR 75.563 and 34 CFR 76.563.

Restricted Restricted rates apply to programs that require a restricted rate per 34 CFR 75.563 and 34 CFR 76.563.

Treatment of Fringe Benefits:

Fringe benefits applicable to direct salaries and wages are treated as direct costs. Pursuant to OMB Circular A-87-Attachment B Paragraph 8.d.(3), unused leave costs for all employees will be allocated as an indirect cost except for those employee salaries designated as a direct cost for the restricted rate calculation.

Capitalization Policy: Items of equipment are capitalized and depreciated if the initial acquisition cost is equal to or greater than \$5,000.

Y900

Section II - Particulars

Limitations: Application of the rates contained in this Agreement is subject to all statutory or administrative limitations on the use of funds, and payments of costs hereunder are subject to the availability of appropriations applicable to a given grant or contract. Acceptance of the rates agreed to herein is predicated on the following conditions: (A) that no costs other than those incurred by the Organization were included in the indirect cost pools as finally accepted, and that such costs are legal obligations of the Organization and allowable under the governing cost principles; (B) the same costs that have been treated as indirect costs are not claimed as direct costs; (C) that similar types of information which are provided by the Organization, and which were used as a basis for acceptance of rates agreed to herein, are not subsequently found to be materially incomplete or inaccurate; and (D) that similar types of costs have been accorded consistent accounting treatment.

Accounting Changes: The rates contained in this agreement are based on the organizational structure and the accounting systems in effect at the time the proposal was submitted. Changes in organizational structure or changes in the method of accounting for costs which affect the amount of reimbursement resulting from use of the rates in this agreement, require the prior approval of the responsible negotiation agency. Failure to obtain such approval may result in subsequent audit disallowance.

Provisional/Final/Predetermined Rates: A proposal to establish a final rate must be submitted. The awarding office should be notified if the final rate is different from the provisional rate so that appropriate adjustments to billings and charges may be made. Predetermined rates are not subject to adjustment.

Fixed Rate: The negotiated fixed rate is based on an estimate of the costs that will be incurred during the period to which the rate applies. When the actual costs for such period have been determined, an adjustment will be made to a subsequent rate calculation to compensate for the difference between the costs used to establish the fixed rate and the actual costs.

Notification to Other Federal Agencies: Copies of this document may be provided to other Federal agencies as a means of notifying them of the agreement contained herein.

Audit: All costs (direct and indirect, federal and non-federal) are subject to audit. Adjustments to amounts resulting from audit of the cost allocation plan or indirect cost rate proposal upon which the negotiation of this agreement was based may be compensated for in a subsequent negotiation.

Reimbursement Ceilings/Limitations on Rates: Awards that include ceiling provisions and statutory/regulatory requirements on indirect cost rates or reimbursement amounts are subject to the stipulations in the grant or contract agreements. If a ceiling is higher than the negotiated rate in Section I of this agreement, the negotiated rate will be used to determine the maximum allowable indirect cost.

Section III - Special Remarks

Alternative Reimbursement Methods: If any federal programs are reimbursing indirect costs by a methodology other than the approved rates in this agreement, such costs should be credited to the programs and the approved rates should be used to identify the maximum amount of indirect costs allocable.

Submission of Proposals: New indirect cost proposals are necessary to obtain approved indirect cost rates for future fiscal years. **The next indirect cost rate proposal is due six months prior to the expiration dates of the rates in this agreement.**

Section IV - Approvals

For the State Education Agency:

Kansas Department of Education
120 SE 10th Avenue
Topeka, KS 66612-1182

For the Federal Government:

U.S. Department of Education
OCFO / FIO / ICG
550 12th Street, SW
Washington, DC 20202-4450

(b)(6)

Signature

Bill Schafar

Name

Director of Fiscal Services & Operations

Title

6/29/2015

Date

Signature

Frances Outland

Name

Director, Indirect Cost Group

Title

JUN 23 2015

Date

Negotiator: Andre Hylton
Telephone Number: (202) 245-7568

COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN: 1486029925D1

DATE:03/01/2012

ORGANIZATION:

FILING REF.: The preceding agreement was dated 06/06/2007

University of Kansas

238 Carruth O'Leary Hall P.O. Box 587

Lawrence, KS 66044-0587

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

SECTION I: INDIRECT COST RATES

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)

EFFECTIVE PERIOD

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE (%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PRED.	07/01/2011	06/30/2012	47.00	On Campus	Organized Research
PRED.	07/01/2012	06/30/2013	49.00	On Campus	Organized Research
PRED.	07/01/2013	06/30/2014	49.50	On Campus	Organized Research
PRED.	07/01/2014	06/30/2015	50.00	On Campus	Organized Research
PRED.	07/01/2011	06/30/2015	50.00	On Campus	Instruction
PRED.	07/01/2011	06/30/2015	33.00	On Campus	Other Sponsored Activities
PRED.	07/01/2011	06/30/2015	26.00	Off Campus	All Programs

<u>TYPE</u>	<u>FROM</u>	<u>TO</u>	<u>RATE(%)</u>	<u>LOCATION</u>	<u>APPLICABLE TO</u>
PROV.	07/01/2015	Until Amended		Use same rates and conditions as those cited for fiscal year ending 06/30/2015.	

*BASE

Modified total direct costs, consisting of all salaries and wages, fringe benefits, materials, supplies, services, travel and subgrants and subcontracts up to the first \$25,000 of each subgrant or subcontract (regardless of the period covered by the subgrant or subcontract). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, student tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as the portion of each subgrant and subcontract in excess of \$25,000.

ORGANIZATION: University of Kansas

AGREEMENT DATE: 03/01/2012

SECTION II: SPECIAL REMARKS

TREATMENT OF FRINGE BENEFITS:

The fringe benefits are specifically identified to each employee and are charged individually as direct costs. The directly claimed fringe benefits are listed below.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

OFF-CAMPUS DEFINITION: For all activities performed in facilities not owned by the institution and to which rent is directly allocated to the project(s) the off-campus rate will apply. Grants or contracts will not be subject to more than one F&A cost rate. If more than 50% of a project is performed off-campus, the off-campus rate will apply to the entire project.

EQUIPMENT DEFINITION:

Equipment means an article of nonexpendable, tangible personal property having a useful life of more than one year and an acquisition cost of \$5,000 or more per unit.

FRINGE BENEFITS:

FICA	Retirement
Disability Insurance	Worker's Compensation
Life Insurance	Unemployment Insurance
Health Insurance	Leave Payment Reserve
Kan Elect	

The above listed rates are also applicable to the University of Kansas Centers for Research, Inc. (EIN 48-0680117)

ORGANIZATION: University of Kansas

AGREEMENT DATE: 03/01/2012

SECTION III: GENERAL

A. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted; such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Office of Management and Budget Circular A-21 Circular, and should be applied to grants, contracts and other agreements covered by this Circular, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

University of Kansas

(INSTITUTION)

(SIGNATURE)

Jeffrey S. Vitter

(NAME)

Provost and Executive Vice Chancellor

(TITLE)

(DATE)

3/7/12

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(b)(6)

(SIGNATURE)

Arif Karim

(NAME)

Director, Central States Field Office

(TITLE)

3/1/2012

(DATE) 7049

HHS REPRESENTATIVE:

Denise Shirlee

Telephone:

(214) 767-3261

COMPONENTS OF THE PUBLISHED FACILITIES & ADMINISTRATIVE COST RATE

INSTITUTION:

UNIVERSITY OF KANSAS

FY COVERED BY RATE:

7/1/2011 - 6/30/2015

RATE TYPE:

ORGANIZED RESEARCH

RATE COMPONENTS:

	ORGANIZED RESEARCH					INSTRUCTION		OTHER SPON ACT	
	On-Camp FY 2012	On-Camp FY 2013	On-Camp FY 2014	On-Camp FY 2015	Off-Camp FY 12 - 15	On-Camp FY 12 - 15	Off-Camp FY 12 - 15	On-Camp FY 12 - 15	Off-Camp FY 12 - 15
Building Depreciation	3.9	4.0	4.4	4.5		4.0		1.2	
Equipment Depreciation	3.8	4.2	4.3	4.4		1.0		0.4	
Interest	2.1	2.3	2.3	2.4		1.0		0.2	
Operations & Maintenance	9.7	11.0	11.0	11.2		9.0		4.2	
Library	1.5	1.5	1.5	1.5		9.0		1.0	
Utility Cost Allowance	0.0	0.0	0.0	0.0					
Administrative Component	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
F&A Rate	47.0	49.0	49.5	50.0	26.0	50.0	26.0	33.0	26.0

CONCURRENCE:

UNIVERSITY OF KANSAS
(Institution)

(Signature)



Jeffrey S. Vittor
(Name)

Provost and Executive Vice Chancellor
(Title)

(Date)

3/7/12

Budget Narrative File(s)

* **Mandatory Budget Narrative Filename:**

To add more Budget Narrative attachments, please use the attachment buttons below.

1.PERSONNEL	FTE	BASE SALARY	TOTAL
<p>Key Personnel: Nancy Lister, M.S.M., Project Administrator, will serve as liaison for KSDE with the Project Director and leadership team at CETE, as well as serve as primary contact with the U.S. Department of Education for the duration of the project. Duties will also include administrative oversight of the project activities and timeline to monitor, manage, and document the activities and funds to meet the goals and budget objectives for the project, as well as assist with logistics of state partner, advisory, and teacher meetings.</p> <p>Year 2 Salary is higher than other years due to 27 pay periods instead of the normal 26.</p>	100% FTE All years	Yr1:\$53,414 Yr2:\$55,469 Yr3:\$53,414 Yr4:\$53,414	Yr1:\$53,414 Yr2:\$55,469 Yr3:\$53,414 Yr4:\$53,414
<p>2. FRINGE BENEFITS Benefits for the Kansas Department of Education are Social Security, Medicare, Retirement (including death and disability), Worker’s Compensation, Unemployment Insurance, Sick/Annual Leave. The State estimates benefit increases for years 3-4.</p>	Yr1:0.204% Yr2:0.204% Yr3:0.214% Yr4:0.224%		Yr1:\$10,962 Yr2:\$11,316 Yr3:\$11,430 Yr4:\$11,965

3. TRAVEL	Basis for Cost Estimate	# of people	\$ per person per trip	Total
<p>Purpose of Travel Governance Board Meeting-Kansas City – Yrs 1-4 Each year the Governance Board will meet in Kansas City. The board will advise the research team on the best practices and most up-to-date scholarship in regards to teachers’ uses of organized learning models as tools to support their formative assessment practices.</p>	Mileage reimbursed at \$0.57 per mile Mileage rates increase \$0.01 per year	1	Mileage: Yr1:\$82 Yr2:\$84 Yr3:\$85 Yr4:\$86	\$337
<p>Teacher Training – Kansas City – Yrs 1-2 During these events, teachers will be provided professional development on learning maps generally and formative assessment best practices. Then they will be instructed on how to use and navigate the learning maps in the web-based interface designed for accessing the learning maps and the materials that are available to support formative assessment. Lastly, teachers will engage in discussion and</p>	Mileage reimbursed at \$.57 per mile (\$0.58 per mile yr2) Lodging of up to \$85	1	Mileage: Yr1:\$82 Yr2:\$84 Lodging: \$85 \$87	\$433

demonstrations of how to implement available materials in their classrooms.	per night per person (\$87 for yr2) Per diem of \$47 per person (\$48 yr2)		Per diem: \$47 \$48	
Kansas Based Teacher Training – Yr3 Same training as described above but held at a central location in Kansas.	Mileage reimbursed at \$0.59 per mile Lodging of up to \$89 per night per person Per diem of \$50 per person		Mileage: \$224 Lodging: \$89 Per diem: \$50	\$363

4. EQUIPMENT	0
5. SUPPLIES	0

6. CONTRACTUAL – Budget Narrative for the University of KS Center for Research is immediately after KSDE’s – starting on page 4	
The University of Kansas Center for Research/ Achievement and Assessment Institute/Center for Educational Testing and Evaluation (CETE). KSDE will partner with CETE, whose history in educational research and evaluation are uniquely suited to the aims of the proposed project. With expertise in learning maps development and use of learning maps as inputs to assessment development, CETE is well positioned and staffed to create formative assessments using learning maps as an organizing structure and to provide the needed professional development to help teachers implement these with high fidelity. With a long track record of successfully building partnerships and programs, CETE continues to support the achievement of young children, school-aged children, adults, and publicly funded agencies.	Yr1:\$1,242,045 Yr2:\$1,689,215 Yr3:\$1,995,512 Yr4:\$751,211

Statement: “As designated EAG applicant, the Kansas Statement Department of Education will follow the procedures for procurement under 34 CFR Parts Part 80.36.”

7. CONSTRUCTION (not applicable)	\$ 0
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8. OTHER	
Communication Expenses: Including conference calls, postage, FedEx, \$450 each year	\$ 1,800

9. TOTAL DIRECT COSTS	\$ 5,942,300
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10. INDIRECT COSTS	
Indirect Costs are calculated at 13.7% of modified total direct costs	\$ 49,912

11. TRAINING STIPENDS	\$ 0
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12. TOTAL COSTS	Year One	Year Two	Year Three	Year Four	TOTAL
Direct Costs	\$1,307,167	\$1,756,753	\$2,061,254	\$817,126	\$5,942,300
Indirect Costs	\$ 12,347	\$ 12,678	\$ 12,432	\$ 12,455	\$ 49,912

The University of Kansas Center for Research, Inc./Achievement and Assessment Institute/ Center for Educational Testing and Evaluation			
All salaries are set consistent with university policies. A 3% increase is calculated in Years 2-4.			
1.PERSONNEL	FTE	BASE SALARY	TOTAL
Key Personnel:			
Neal Kingston, Ph.D. , is a Professor in the Educational Psychology Department at the University of Kansas and serves as director of AAI. He is also director and principal investigator of the DLM Alternate Assessment Consortium.	Yr1:10%	\$216,024	\$21,602
	Yr2:10%	\$222,504	\$22,250
	Yr3:10%	\$229,176	\$22,918
	Yr4:10%	\$236,052	\$23,605
Angela Broaddus, Ph.D. , is a Research Associate at the CETE, where her research has focused on the development and modeling of the learning map used as the foundation of the DLM Alternate Assessment system and the learning map's subsequent use as an instructional resource. She also has directed the development of an intuitive interface for interacting with learning maps and associated resources.	Yr1:40%	\$87,132	\$34,853
	Yr2:40%	\$89,748	\$35,899
	Yr3:40%	\$92,436	\$36,974
	Yr4:40%	\$95,208	\$38,083
Russell Swinburne-Romine, Ph.D. , is the English Language Arts Research Team Leader for DLM. He is responsible for overseeing the ELA test development process, including content decisions related to the test blueprint, test specifications, item writing standards and guidelines, internal item review, and external item review. He is responsible for the development and revision of the ELA sections of the learning map.	Yr1:10%	\$80,712	\$8,071
	Yr2:10%	\$83,136	\$8,314
	Yr3:10%	\$85,632	\$8,563
	Yr4:10%	\$88,200	\$8,820
Jonathan Schuster, Ph.D. , is a Research Associate at CETE who has worked on the development and modeling of the learning map for English language arts for over four years. His expertise is in synthesizing relevant literature in cognitive psychology and language development to inform learning map development and use by teachers and test developers.	Yr1:40%	\$66,960	\$26,784
	Yr2:40%	\$68,964	\$27,586
	Yr3:40%	\$71,028	\$28,411
	Yr4:40%	\$73,164	\$29,266
Jim Miller, Ph.D. , is a professor of Electrical Engineering and Computer Science with active research and teaching interests in computer graphics, large-scale multidimensional and multivariate data visualization, geometric modeling, and technology in education. He also serves as chair of the eLearning Research Collaborative (eRC), a research laboratory that is pursuing interdisciplinary research related to the development of technology in education.	Yr1:25%	\$134,136	\$33,534
	Yr2:25%	\$140,844	\$35,211
	Yr3:12.5%	\$147,888	\$18,486
	Yr4:0%	\$0	\$0
Richard Branham, M.F.A. , is Professor of Industrial Design, working in areas of cognitive human factors and interaction design strategies, methods, and techniques, specializing in wayfinding, navigation, and use models. He has over 30 years of professional experience developing interfaces between people and	Yr1:8%	\$118,548	\$9,484
	Yr2:4%	\$122,100	\$4,884
	Yr3:0%	\$0	\$0
	Yr4:0%	\$0	\$0

technology and 25 years of teaching and research experience.			
Project Manager, TBH , will have sufficient skills and experience needed to coordinate day-to-day aspects of the project, liaise between CETE and KSDE, manage logistics and travel for meetings, provide support for project communications, and other duties as needed.	Yr1:75% Yr2:100% Yr3:100% Yr4:75%	\$45,000 \$46,356 \$47,748 \$49,176	\$33,750 \$46,356 \$47,748 \$36,882
Other Personnel:			
Other staff, including University members of the Governance Board, an ELA Post Doc, Curriculum and Assessment Assistants, Senior Research Assistants, Editing and Communication staff, and graduate students will support implementation of the project scope.	Yr1 Yr2 Yr3 Yr4		\$256,381 \$395,791 \$345,563 \$174,552

2. FRINGE BENEFITS Benefits for the University of Kansas are calculated at 35% for faculty and staff: Social Security 6.20%, Medicare 1.45%, Retirement (including death and disability) 9.5%, Worker’s Compensation 0.583%, Unemployment Insurance 0.33%, Health Insurance 16.59%, Sick/Annual Leave 0.815%. Benefits for students are calculated at 7%: Worker’s Compensation 0.583%, Unemployment Insurance 0.33%, Health Insurance 6.5%, Sick/Annual Leave 0.275%. Benefits for Students are calculated at 15% > 75% FTE and 7% < 75% FTE.	Yr1 Yr2 Yr3 Yr4		\$134,424 \$186,684 \$165,752 \$103,020
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3. TRAVEL				
Purpose of Travel	Basis for Cost Estimate	# of people	\$ per person per trip	Total
Governance Board: Each year the Governance Board will meet in Kansas City. The board will be composed of prominent researchers in formative assessment, teacher education, and special education, and will advise the research team on the best practices and most up-to-date scholarship in regards to teachers’ uses of organized learning models as tools to support their formative assessment practices.	Lodging of up to \$125 per night per person (5 people only) Per diem of \$30 per person for 5 people only (supper only- all other meals provided) Mileage to/from hotel	5 people per diem & lodging 6 people mileage	Lodging: \$125 Per diem: \$30 Mileage: \$69	\$1,189 each year for 4 years = \$4,756

	reimbursed at \$.575 per mile			
<p>Teacher Training: In years one and two, Teacher Trainings will be held in Kansas City. During these events, teachers will be provided professional development on learning maps generally and formative assessment best practices. Then they will be instructed on how to use and navigate the learning maps in the web-based interface designed for accessing the learning maps and the materials that are available to support formative assessment. Lastly, teachers will engage in discussion and demonstrations of how to implement available materials in their classrooms.</p>	<p>Lodging of up to \$125 per night per person (4 people only)</p> <p>Per diem: \$30 per person (4 people only)</p> <p>Mileage: \$69 Per person</p>	<p>4 people per diem & lodging</p> <p>6 people mileage</p>	<p>Lodging: Yr 1 \$250 Yr2 \$500</p> <p>Per diem: Yr1 \$60 Yr2 \$120</p> <p>Mileage: \$69</p>	<p>Yr1: \$1,654</p> <p>Yr2: \$2,894</p>
<p>State Based Teacher Training: During these events, teachers will be provided professional development on learning maps generally and formative assessment best practices. Then they will be instructed on how to use and navigate the learning maps in the web-based interface designed for accessing the learning maps and the materials that are available to support formative assessment. Lastly, teachers will engage in discussion and demonstrations of how to implement available materials in their classrooms. The only difference among teacher training events will be the number of teacher participants and their locations.</p>	<p>Average airfare of \$420 per person, 2 trips</p> <p>Lodging of up to \$125 per night/ person</p> <p>Per diem of \$60 per day per person/trip</p> <p>Mileage to/from airport for 2 trips reimbursed at \$.575 per mile</p> <p>Mileage for 2 vehicles to drive to 3 States reimbursed at \$.575 per mile</p>	<p>6</p>	<p>Airfare: \$420</p> <p>Lodging (3 nights): \$375</p> <p>Per diem (4 days): \$240</p> <p>Average Mileage Costs per person per trip: \$78</p>	<p>Yr3 Only: \$27,019</p>

	Car Rental from airport to site of training at \$75 per day x 2 cars for 2 trips		Car Rental: \$100	
Conference Travel: Two people in year 1 and three persons in years 2-4 will travel to one professional conference and/or meeting. It is anticipated that these conferences will last four days, with three nights lodging. Throughout the two years of the project, presentation proposals will be submitted to appropriate conferences, including but not limited to the Council for Exceptional Children, National Council of Teachers of Mathematics, American Educational Research Association, the National Conference on Student Assessment, and the National Council on Measurement in Education.	<p>Average airfare of \$400 per person</p> <p>Lodging of up to \$200 per night person</p> <p>Per diem of \$60 per day per person</p> <p>Mileage to/from airport reimbursed at \$.575 per mile</p> <p>Registration fees of \$250 per person</p> <p>Other Travel Costs including ground transportation and Airline fees - \$100 per person</p>	<p>Yr 1: 2 people</p> <p>Yrs 2-4: 3 people each year</p>	<p>Airfare: \$400</p> <p>Lodging (3 nights): \$600</p> <p>Per diem (4 days): \$240</p> <p>Mileage: \$69</p> <p>Registration fee: \$250</p> <p>Other Travel: \$100</p>	<p>Yr1: \$3,318</p> <p>Yrs2-4: \$14,931</p>

4. EQUIPMENT	0
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5. SUPPLIES Office Supplies: Includes consumable office supplies and other necessary consumable expenditures, consistent with the needs and scope of this specific project. \$500 each year	\$2,000
Computers:	

Five laptops in Year 1 @ \$2,000/each are needed for new staff who will be hired to manage the project and develop the learning maps and formative assessment materials – one project manager, three curriculum and assessment specialists, and one post doctoral researcher are anticipated to be new hires who will require these computers.	\$10,000
One IMac (Year 1) – to be used for video editing	\$1,368
Audio visual equipment for ASL videos. Includes: 2 cameras –2 x \$2,000, year 1	\$4,000
Video Equipment - \$4,000, year 2	\$4,000
Audio - recorders and microphones - \$1,000, year 1	\$1,000
Lighting - 2 x 2-LED Light Kits and Accessories \$5,000, year 1	\$5,000
Software – licensing fees for video production, \$100 years 1 and 2	\$200

6. CONTRACTUAL –	
Kim Good. Ph.D. Managing Evaluator with McREL, serves as the evaluation project director for several evaluation projects. Her evaluation portfolio includes five multiyear projects funded through the U.S. Department of Labor and the U.S. Department of Education of which one is an Enhanced Assessment Grant. She will use her expertise in research and evaluation to provide formative data to support the projects development and implementation and execute a summative evaluation to gauge the success of the project in attaining its goals and to measure project impact.	Yr1:\$65,745 Yr2:\$71,116 Yr3:\$78,795 Yr4:\$74,403
Design Specialist –TBD , will have sufficient skills and experience needed to collect and organize data collected from initial users of the web-based learning maps interface to inform iterative design and development of the interface. This individual will work closely with the design expert, project director, and software team to insure best practices regarding user interface design and development.	Yr1:\$50,000 Yr2:\$50,000

7. CONSTRUCTION (not applicable)	\$ 0
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8. OTHER	
Printing and Copying: \$1,000 each year in accordance with the scope of the project	\$4,000
Communication Expenses: Including conference calls, postage, FedEx, \$500 each year	\$2,000
Webhosting for videos \$1,000 each year	\$4,000
Map Reviewers – 10 people x 2 days x \$150/day year 1 – will review the learning maps to insure they reflect learning and development that is consistent with their observations of actual students.	\$3,000
Expert Reviewers – 5 people x 60 modules x \$60/module, year 1 only– will review the learning maps to insure they reflect what is reported in the literature describing learning and development of English language arts.	\$18,000
Teacher Reviewers – 50 teachers x 6 modules x \$100/module, year 2; 100 teachers x 6 modules x \$100/module, year 3– Teacher reviewers during the first two years of the project will serve as pilot testers of the learning maps, formative assessment materials, and the user interface.	\$90,000
Governance Board Expenses: Member honorarium for 3 persons, 1 trip, 3 days each trip @ \$1,500 per day, each year - \$4,500 per person per year	\$54,000

Travel expenses for 3 persons, 1 trip, \$500 transportation, \$250 lodging for 2 days, \$60 per diem for 2 days, each year - \$870 per person per trip	\$10,440
State Partners in attendance at Governance Board Meetings: Travel expenses for 5 persons, 1 trip, \$500 transportation, \$250 lodging for 2 days, \$60 per diem for 2 days, each year - \$870 per person per trip	\$17,400
Teacher Training Year 1: Teacher participant honorarium for 50 persons Yr1, 5 states, \$150 per day for 3 days, \$450 per person	\$22,500
Teacher Travel expense for 50 persons \$500 transportation, \$188 lodging for 3 days (double occupancy), \$150 per diem (per diem minus supplied meals) - \$838 per person	\$41,900
Teacher Training Year 2: Mentors from Year 1 - Teacher participant honorarium for 50 persons, \$150 per day for 5 days, \$750 per person	\$37,500
Mentor Teacher Travel expense for 50 persons \$500 transportation, \$313 lodging for 3 days (double occupancy), \$210 per diem (per diem minus supplied meals), \$1,023 per person	\$51,150
New Teachers for Year 2 Teacher participant honorarium for 50 persons Yr1, 5 states, \$150 per day for 3 days, \$450 per person	\$22,500
Teacher Travel expense for 50 persons \$500 transportation, \$188 lodging for 3 days (double occupancy), \$150 per diem (per diem minus supplied meals) - \$838 per person	\$41,900
State Based Teacher Training Year 3 Mentors from Other Partner States - Teacher participant honorarium for 8 persons, \$150 per day for 3 days, \$450 per person	\$3,600
Mentor Teacher Travel expense for 8 persons \$500 transportation, \$188 lodging for 3 days (double occupancy), \$150 per diem (per diem minus supplied meals), \$838 per person	\$6,704
New Teachers Teacher participant honorarium for 400 persons (total for all 5 states), \$150 per day for 3 days, \$450 per person	\$180,000
Teacher Travel expense for 400 persons \$300 transportation, \$188 lodging for 3 days (double occupancy), \$120 per diem (per diem minus supplied meals) - \$608 per person	\$243,200
Meeting Costs: Includes food, audio visual, room rental and WIFI costs for each meeting Governance Board Meeting: 2 days: Cost per day \$1,050 food/room; \$435 audio visual; \$120 WIFI = \$3,210/year	\$12,840
Teacher Training Year 1: 3 days: Cost per day \$3,150 food/room; \$435 audio visual; \$120 WIFI	\$11,115
Teacher Training Year 2: (includes Yr 1 Teachers and new Yr2 Teachers) Year 1 Teachers and project staff – food \$50 per person per day, total of 5 days	\$14,250

Year 2 Teachers - food \$50 per person per day, total of 3 days	\$ 7,500
Room expenses: per day costs for 5 days - \$300 room, \$435 audio visual, \$120 WiFi	\$ 4,275
State Based Year 3 Training (costs for all trainings): held in a school with only food costs – 3 days in each State: \$12,480 food per day	\$37,440
Tuition Expense for Graduate Research Assistants: Per University of Kansas policy, Graduate Assistant tuition is requested for the Graduate Research Assistants each year. The rate is calculated in accordance with the University of Kansas tuition and fee schedule.	Yr1:\$24,254 Yr2:\$25,279 Yr3:\$18,896 Yr4:\$ 6,212

9. TOTAL DIRECT COSTS	\$ 3,898,555
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10. INDIRECT COSTS Indirect Costs are calculated at 50% of total direct costs, as per agreement with Kansas State Department of Education.	\$1,779,428
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11. TRAINING STIPENDS (Not Applicable)	\$ 0
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12. TOTAL COSTS	Year One	Year Two	Year Three	Year Four	TOTAL
Direct Costs	\$849,696	\$1,158,275	\$1,362,905	\$527,679	\$3,898,555
Indirect Costs	\$392,349	\$ 530,940	\$ 632,607	\$223,532	\$1,779,428

**U.S. DEPARTMENT OF EDUCATION
BUDGET INFORMATION
NON-CONSTRUCTION PROGRAMS**

OMB Number: 1894-0008
Expiration Date: 04/30/2014

Name of Institution/Organization

Kansas State Department of Education

Applicants requesting funding for only one year should complete the column under "Project Year 1." Applicants requesting funding for multi-year grants should complete all applicable columns. Please read all instructions before completing form.

**SECTION A - BUDGET SUMMARY
U.S. DEPARTMENT OF EDUCATION FUNDS**

Budget Categories	Project Year 1 (a)	Project Year 2 (b)	Project Year 3 (c)	Project Year 4 (d)	Project Year 5 (e)	Total (f)
1. Personnel	53,414.00	55,469.00	53,414.00	53,414.00		215,711.00
2. Fringe Benefits	10,962.00	11,316.00	11,430.00	11,965.00		45,673.00
3. Travel	296.00	303.00	448.00	86.00		1,133.00
4. Equipment	0.00	0.00	0.00	0.00		0.00
5. Supplies	0.00	0.00	0.00	0.00		0.00
6. Contractual	1,242,045.00	1,689,215.00	1,995,512.00	751,211.00		5,677,983.00
7. Construction	0.00	0.00	0.00	0.00		0.00
8. Other	450.00	450.00	450.00	450.00		1,800.00
9. Total Direct Costs (lines 1-8)	1,307,167.00	1,756,753.00	2,061,254.00	817,126.00		5,942,300.00
10. Indirect Costs*	12,347.00	12,678.00	12,432.00	12,455.00		49,912.00
11. Training Stipends	0.00	0.00	0.00	0.00		0.00
12. Total Costs (lines 9-11)	1,319,514.00	1,769,431.00	2,073,686.00	829,581.00		5,992,212.00

***Indirect Cost Information (To Be Completed by Your Business Office):**

If you are requesting reimbursement for indirect costs on line 10, please answer the following questions:

(1) Do you have an Indirect Cost Rate Agreement approved by the Federal government? Yes No

(2) If yes, please provide the following information:

Period Covered by the Indirect Cost Rate Agreement: From: 07/01/2015 To: 06/30/2018 (mm/dd/yyyy)

Approving Federal agency: ED Other (please specify):

The Indirect Cost Rate is 13.70 %.

(3) For Restricted Rate Programs (check one) -- Are you using a restricted indirect cost rate that:

Is included in your approved Indirect Cost Rate Agreement? or, Complies with 34 CFR 76.564(c)(2)? The Restricted Indirect Cost Rate is %.

Name of Institution/Organization Kansas State Department of Education	Applicants requesting funding for only one year should complete the column under "Project Year 1." Applicants requesting funding for multi-year grants should complete all applicable columns. Please read all instructions before completing form.	
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**SECTION B - BUDGET SUMMARY
NON-FEDERAL FUNDS**

Budget Categories	Project Year 1 (a)	Project Year 2 (b)	Project Year 3 (c)	Project Year 4 (d)	Project Year 5 (e)	Total (f)
1. Personnel						
2. Fringe Benefits						
3. Travel						
4. Equipment						
5. Supplies						
6. Contractual						
7. Construction						
8. Other						
9. Total Direct Costs (lines 1-8)						
10. Indirect Costs						
11. Training Stipends						
12. Total Costs (lines 9-11)						

SECTION C - BUDGET NARRATIVE (see instructions)

U.S. DEPARTMENT OF EDUCATION
SUPPLEMENTAL INFORMATION
FOR THE SF-424

OMB Number: 1894-0007
Expiration Date: 07/31/2014

1. Project Director:

Prefix:	First Name:	Middle Name:	Last Name:	Suffix:
Ms.	Nancy		Lister	

Address:

Street1:	900 SW Jackson
Street2:	
City:	Topeka
County:	
State:	KS: Kansas
Zip Code:	66612-1212
Country:	USA: UNITED STATES

Phone Number (give area code)	Fax Number (give area code)
785 296-7922	785 296-3791

Email Address:

nlist@ksde.org

2. Novice Applicant:

Are you a novice applicant as defined in the regulations in 34 CFR 75.225 (and included in the definitions page in the attached instructions)?

Yes No Not applicable to this program

3. Human Subjects Research:

a. Are any research activities involving human subjects planned at any time during the proposed project Period?

Yes No

b. Are ALL the research activities proposed designated to be exempt from the regulations?

Yes Provide Exemption(s) #:

No Provide Assurance #, if available:

c. If applicable, please attach your "Exempt Research" or "Nonexempt Research" narrative to this form as indicated in the definitions page in the attached instructions.

Nonexempt_Research_Narrative.pdf	Add Attachment	Delete Attachment	View Attachment
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Kansas State Department of Education Enhanced Assessment Grant Application**NON-EXEMPT RESEARCH NARRATIVE****Use of Learning Maps as an Organizing Structure for Formative Assessment****1. Human Subjects Involvement and Characteristics**

This project will involve teachers and students in five member states. Over the course of the project, approximately 400 teachers will participate, and these teachers' students will also be involved by taking their state assessments in mathematics and English language arts. Teachers will participate (1) on panels to provide guidance and feedback to researchers, (2) in professional development focused on learning maps as instructional supports, and (3) by implementing and providing feedback on learning maps based formative assessment tools. Students will participate in one research related capacity:

- Student state assessments will be analyzed for spring 2018 and spring 2019 to evaluate the effectiveness of high fidelity implementations of learning maps based formative assessment on student achievement of rigorous academic standards. Two samples will be identified in these data (i.e., students of participating teachers and a corresponding sample identified through propensity score matching).

2. Sources of Material

There will be four sources of data:

- Teachers who participate and implement materials generated in this project will submit feedback surveys addressing self-reports of fidelity of implementation and perceived usefulness of the products they implemented.
- Digital data will be collected to track the number of times teachers visit the learning maps interface, the length of time teachers remain active in the interface, the number

of searches teachers enact in the learning map, and the number of times different resources are opened and downloaded.

- Survey and interview data will be collected from participating teachers to gauge the usefulness of learning maps based formative assessment tools and the software where they will be hosted. All identifying information of participants will be stored on a secure server.
- Students participating in the state assessments will provide answers to questions in the format determined by each state's summative assessment program. Students must be tracked by unique student ID numbers provided by each state and all identifying information will be stored on a secure server. All personal identifying information will be destroyed at the completion of this project. Any files created for the purpose of data analysis will have all identifying information removed.

3. Recruitment and Informed Consent

Under 45 CFR 46.101 (b) (2), informed consent is not required for “research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects’ responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects’ financial standing, employability, or reputation.” Participating states’ state assessments are educational tests. Students will not be identified by name and any linking information will be removed from the dataset before analyses are conducted. Moreover, no questions will be asked that produce any risk to the students.

4. Potential Risks

The risks associated with this project relate to potential breaches of confidentiality related to student identity or scores related to achievement. In 30 years' work on student assessments for the state of Kansas, no such breach has occurred.

5. Protection Against Risk

All data will be stored in a secure database at the University of Kansas Center for Educational Testing and Evaluation (KU-CETE) which also maintains the highly confidential achievement test scores for hundreds of thousands of students participating in the various state accountability assessments each year. Access to the research database will be protected with strong passwords and encryption and is accessible only on a need to know basis by KU-CETE staff. Any data for analyses performed by project staff will have had all student identifying information removed.

Teacher identities will be known to the project staff who interact with them. Records which include subject's names or other identifying information, such as video, will be kept in locked file cabinets or on secure servers in the case of electronic records. All subjects will be assigned numbers, and these code numbers will be used on all data records instead of names. Project staff will be asked to respect teacher and student confidentiality in terms of participation and comments related to performance. Project staff will sign a confidentiality agreement requiring them not to reveal student data of any kind or discuss test performance with any student or individual outside of the project. Any notes, forms, video, or protocols will be immediately stored to prevent accidental breaches in confidentiality. All staff members will be asked to abide by a code of confidentiality. No names will be used in conjunction with any reports of the results of this project.

6. Importance of the Knowledge to be Gained

Since this research and development project is fulfilling a critical national need identified by the United States Education Department, the risks associated with this project appear to be justified for the benefits that can be achieved. The completion of this project promises to provide participating states with tools that will significantly improve our understanding of how to advance student achievement through defining and evaluating best practices in using learning maps as an organizing structure for effective formative assessment, resulting in improved assessment validity and educational planning.

7. Collaborating Sites

Students in this study will be from schools in Kansas, Alaska, Iowa, Missouri, and Wisconsin.