

Collaboration for 21st Century K-12 Teaching and Learning (C21CTL)

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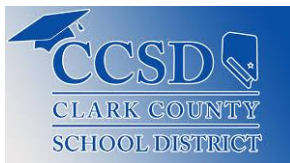
Partners:



Knowledge Building in Action - KBIA
A 501(c)(3) nonprofit organization



University of Nevada, Las Vegas - UNLV
College of Education



Clark County School District - CCSD
Las Vegas, Nevada



Student Empowerment Academy –SEA
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World Federation of Associations of
Teacher Education - WFATE
A global membership association of educators



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Collaboration for 21st Century K-12 Teaching and Learning – C21CTL

A. Quality of Project Design

(A.1.) Alignment with Priorities.

The proposed project specifically addresses the U.S. Department of Education’s Investing in Innovation Fund (i3) *Absolute Priority 3* and *Competitive Preference Priority Supporting Novice i3 Applicants*, and to a lesser degree *Absolute Priorities 1, 2, 4 and 5*.

A.1.1. In aligning with *Absolute Priority 3*, the Collaboration for 21st Century K-12 Teaching and Learning (C21CTL) supports the use of technology in the classroom for instructional practice that improves student learning and promotes effective teaching in K-12 classrooms by implementing the ALTE Learning & Teaching Ecosystem (www.altlearningecosystem.com).

This model incorporates real-time data from students’ classroom work on the educational technology of choice, the Knowledge Forum™ (www.knowledgeforum.com), into instructional practice that **provides students with the individualized support they need to acquire knowledge and skills** that will lead them to success in school, and later in the workforce and in life. The ALTE model constitutes a strategy that has been proven effective in improving results for students, both for short-term gains in subject mastery to excel in standardized testing and for long-term gains throughout the education continuum. Joining forces with UNLV’s Education Student Practica and Internships, **an entire school system would improve its capacity to achieve positive results in academic achievement and student learning.** The data analysis component of C21CTL through formative and summative assessments of student progress and interactions can be leveraged to help teachers meet students’ individualized and collective needs. The ALTE model is also intended to be a validated solution to persistent educational challenges, such as college and career readiness, drop-outs, achievement and gender gaps, addressing

learning needs of English Language Learners (ELLs) and students with special needs. It supports the expansion of cost-effective solutions to serve large numbers of students, both in urban and rural settings, with a model that is easily scalable and affordable, and has a 20 year track record of success.

A.1.2. The project also leverages technology to inform and support the **Professional Development of Teachers** through participation in UNLV's COE practicum and internship coursework, teacher engagement in the KB Community of Practice (KBCOP), and promoting UNESCO's ICT CFT - Information and Community Technologies Competency Framework for Teachers.

A.1.3 Formative assessment techniques supported by the ALTE model identify where students are and then move them toward intended learning goals, making students more accountable for their own learning. The **C21CTL utilizes educational technology tools that enable the development, visualization, and rapid analysis of data throughout the learning process.**

Assessment tools embedded in the Knowledge Forum™ evaluate students' thinking and progress toward acquiring knowledge as their classroom work proceeds. Rather than waiting until year-end or completion of a unit of work or study to provide feedback, when it is too late to make adjustments, these assessment tools allow data to be collected and analyzed in real time. Thus, teachers are able to adapt materials to ensure learning objectives are achieved and adjustments can be made on the fly. This constitutes an additional innovation of the ALTE model for supporting effective teaching. Java-based applets perform an internal assessment of reading, writing, vocabulary growth and subject mastery, with an important indicator being the growth of vocabulary, and the increasingly important the growth of STEM lexicon.

A.1.4. To a lesser degree, the proposed project also aligns with other i3 priorities:

- ***Absolute Priority 1—Improving the Effectiveness of Principals:*** The KBCOP constitutes a support system for a network of principals to connect with each other and access best practices. Feedback identifies needs and guides professional development while supporting the acquisition of ICT skills that will inform decision-making. Additionally, the Knowledge Forum™ supports the continuous improvement of instruction and an analysis of Student Growth as a measure of professional practice.

- ***Absolute Priority 2—Improving STEM Education:*** By virtue of the classrooms functioning as scientific research communities, the learning environments supported by the ALTE model provide multidisciplinary experiences promoting curiosity, exploration, innovation and real world experiences, which are key to motivating students to learn and embrace STEM, leading to critical thinking through scaffolding and the scientific method. A component of the Summer Institute will be dedicated to providing students with opportunities for deliberate practice that increases STEM learning and engagement, coupled with teachers being trained on ALTE.

- ***Absolute Priority 4—Influencing the Development of Non-Cognitive Factors:*** ALTE serves as a model that improves students' academic behaviors, attitudes and mindsets through learning that is relevant to their lives, developing social skills through collaboration and communication along the way. ALTE also supports a new approach to learning with strategies that engage students and enhance their motivation and learning. It also promotes global competence through the KBIP.

- ***Absolute Priority 5—Serving Rural Communities:*** ALTE seeks to provide opportunities for rural communities worldwide to learn from each other, and to foster improved communications between practitioners, communities, rural organizations, policy makers and academia around issues of rural education. C21CTL integrates several concepts of distance learning including the Knowledge Forum™ , videoconferencing, the KBIP and the KBCOP.

(A.2.) Benefits of utilizing the ALTE model: We are proposing a true paradigm shift with a model that reimagines learning, where the format of the traditional, more passive approach to learning is replaced by a more collaborative method of learning. Instead of sitting and listening to the teacher, students are encouraged to work together to discuss and solve problems in a collaborative learning environment, led by the teacher who becomes a facilitator of learning rather than a transmitter of pre-determined content. In this process, students acquire important 21st Century skills such as critical thinking, communication and creativity, the “4Cs” of future education, while supporting the development and ongoing training of effective educators.

Students in the small-group learning environments supported by the ALTE model are members of a “knowledge community”, functioning collaboratively in similar fashion to a scientific community of investigation and research. Here, students actively engage in brainstorming ideas, identifying problems, researching for solutions and evidence, debating and engaging in discussion and discourse with their classmates and with their peers. These activities have a clear goal of co-creating new perspectives and advancing knowledge beyond the limit of an individual. Numerous research findings show that this approach, specifically the knowledge-building approach, induces motivation to learning, improves learners’ higher order thinking (e.g. critical thinking, problem-solving), and fosters personal development (e.g. communication skills, inter-personal skills and lifelong-learning attitudes).

In his book *The Effective Executive*, Peter Drucker predicted that the major changes in society would be brought about by information. Drucker argues that *knowledge* has become the central, key resource that knows no geography, and that the largest working group will become “*knowledge workers*.” The skills needed by the modern-day knowledge worker, a group that constitutes the fastest growing sector of today’s global work force, are the same as

those acquired by students who engage in knowledge building, beginning at an early age before they lose the joy of learning. These skills prepare them for education, employment, and becoming global citizens in the knowledge society, where information is generated, processed, shared and made available to all members of a society to improve the human condition.

Teachers need to be equipped to help their students become tomorrow's knowledge worker. To address this challenge, UNESCO has created, in partnership with industry leaders and global subject experts, an international benchmark which sets out the competencies required to teach effectively with ICTs. A fundamental experience to any successful education is the teacher-learner relationship, and the UNESCO's ICT Competency Framework for Teachers (CFT) addresses all aspects of a teacher's work, such as understanding ICT in education, curriculum and assessment; pedagogy ICT; organization and administration; and teacher professional learning. The ICT CTF framework is arranged in three different approaches to teaching, corresponding to the successive stages of a teacher's development: **Technology Literacy**, enabling students to use ICT in order to learn more efficiently. **Knowledge Deepening**, enabling students to acquire in-depth knowledge of their school subjects and apply them to complex, real-world problems. **Knowledge Creation**, enabling students, citizens and the workforce they become to create the new knowledge required for more prosperous societies. UNESCO's ICTs CFT is an integral and critical component of C21CTL.

While mainstream schooling focuses on tasks, knowledge building focuses on ideas, with dynamics of epistemic agency, idea improvement and the advancement of community knowledge within learning environments that support a culture of inquiry and evidence. Learners take on progressive problem solving, seeking to understand problems and issues at deeper levels rather than memorization techniques. And because they are constantly reading and

writing, students gain mastery of the subject being studied and do better in standardized testing. Additionally, students in classrooms where deeper learning is the focus are motivated and challenged. They apply what they have learned in one subject area to newly-encountered situations in another, and they can see how their classwork relates to real life. Deeper learning leads to the acquisition of knowledge and skills students must possess to succeed in 21st century jobs and civic life. At its heart is a set of competencies students must master in order to develop a keen understanding of academic content, able to apply their knowledge to problems in the classroom and later on the job. Moreover, in the computer-supported collaborative learning environments supported by the ALTE model, there is lots of peer learning going on, and students can learn better when they learn from each other.

Assessment tools embedded in the ALTE model can be leveraged to support a teacher's development as an effective educator. Under the status quo of K-12 education in the U.S., teachers are expected to be content conveyors, following pre-defined curriculum in preparation for accountability tests; utilizing the ALTE model, teachers become effective, creative agents at the complex intersection of navigating academic content and student cognition, thereby helping improve student achievement. The activities supported by the ALTE model dovetail with the goals of **professional development** for K-12 teachers: to ensure opportunities that improve the craft of teaching with tools to do so, while providing data that school systems can use in determining whether students learn more as a result. C21CTL activities also contribute to professional development and training research bases. We adapted Daele's Model of Professional Development as a cycle for our Knowledge Building Community of Practice (KBCOP), where educators - teachers, principals, tech support and other faculty members - can be trained, use the tools, methodologies and resources, make references to literature, case studies

and best practices, and interact with each other on an ongoing basis. The KBCOP supports interaction between partnered teachers, who meet periodically through videoconferencing. Here, they can examine student work on the Knowledge Forum™ from the collaborative classroom project around a common issue or theme chosen for the C21CTL, brainstorm ways to instruct students who haven't yet mastered standards, and evaluate results. This ensures that teachers both have enough time for accessible and inexpensive professional development and work to improve their own practice. The KBCOP also sustains an interactive professional development program that guides educators as they learn to use minute-to-minute and day-by-day strategies to integrate assessment into student learning.

On the professional development and training side of C21CTL, UNLV education undergraduate and graduate students teaching at CCSD schools will implement the ALTE model in their classroom. The following table shows the progression of teachers and students incorporated into C21CTL for benefits gained during the three –year grant cycle. Initially, one CCSD classroom per grade in middle school (4) and high school (4) will participate in the Knowledge Building International Project (KBIP), an international collaboration of K-12 classrooms engaging in knowledge-building activities, and will grow exponentially.

Table 1. Growth of students and teachers participating in KBIP

Clark County School District Schools and Partnered Schools	Number of Students YR 1	Number of Students YR 2	Number of Students YR 3	Number of Teachers YR 1	Number of Teachers YR 2	Number of Teachers YR 3
CCSD	250	500	750	8	16	24
Partnered classrooms – middle school	150	300	450	4	8	16
Partnered classrooms – high school	150	300	450	4	8	16
3 Year TOTAL	3,300 Students			104 Teachers		

NOTE: These numbers do not include the principals, technology staff and faculty receiving ALTE training.

(A.3.) Strategies that will achieve Goal, Objectives /Performance Measures

A.3.1. Identifying, training and monitoring 104 teachers - education majors at UNLV and teachers at participating schools - on the effective use of knowledge-building methodologies, education technology and learning assessment with the ALTE model in their classrooms during the school cycles of 2015-2016, 2016-2017, and 2017-2018. Also train principals and staff.

A.3.2. Design computer-supported collaborative learning environments in K-12 classrooms that incorporate real-time data into instructional practice that provides students with the individualized support they need to be successful and can also be leveraged to provide educators with targeted support that helps them meet students' needs. In selecting classrooms for participation, C21CTL will adhere to Section 504 of the Rehabilitation Act of 1973.

A.3.3. Partner CCSD classrooms with those participating in the Knowledge Building International Project (KBIP) supported by the World FATE. Mentor CCSD teachers with KBIP teachers, and incorporate them in the KBCOP.

A.3.4. Design and evaluate QEDs for the development, visualization, and rapid analysis of data in different classrooms, to inform instructional practices and improve learning outcomes.

A3.5. Validate the project as a model solution to persistent educational challenges and support the expansion of the model to serve substantially larger numbers of students, moving to the validation and scale-up phases of the Investing in Innovation grant program.

(A.4.) Clarity and coherence of project goals: Achieving Intended Results.

Figure 1. reveals a logic model of how the project proposes to achieve its intended goals:

21 st Century Teaching and Learning Collaboration (C21CTL) – Logic Model				
Inputs	Activities	Outputs	Outcomes	Impact
<p>US DoE Funds</p> <p>C21CTL Partner Support:</p> <ul style="list-style-type: none"> - Knowledge Building in Action - Clark County School District - Student Empowerment Academy and other partnered classrooms outside CCSD - University of Nevada, Las Vegas - State University of New York, Albany <p>Project Leadership Expertise</p> <p>Funding Match – Support from Private Sources Already Identified:</p> <ul style="list-style-type: none"> - Private Foundations - Corporate Responsibility - In-kind Contributions <p>Additional Project Support:</p> <ul style="list-style-type: none"> - World Federation of Association of Teacher Education 	<ul style="list-style-type: none"> - Establish Project Partnership, select CCSD Partnership Schools, including identifying school characteristics, and individual teachers - Conduct Technology Analysis in CCSD Participating Schools - Tap into UNLV Teacher Education Program, including continuity among stages of teacher professional development, internships and training experienced teachers as pre-service mentors and school-based teacher educators - Design UNLV COE practicum and field placement guidelines - Identify Classrooms to Participate in the Knowledge Building International Project (KBIP), including selection of common theme, Partner Classrooms - Design a series of <i>quasi-experiment designs</i> (QEDs), for a framework to support claims of academic achievement - Establish project data tracking system - Establish review process design and project evaluation 	<ul style="list-style-type: none"> - Project MOUs and agreements - Conduct Orientation and ALTE Model Training for Educators/Summer Institute - Implement ALTE Model in classrooms, including establishing connections with partnered classrooms - Integrate UNLV COE practicum and field placement requirements in the classroom, including extensive and intensive supervision of clinical work - Establish QED for each classroom participating in KBIP - Engage students in contextualized inquiry-based knowledge building - Interact with partnered classrooms through videoconferencing - Contribute data to project data base for external evaluation and project improvement and to QEDs for an assessment of learning outcomes 	<p>Initial Outcomes</p> <ul style="list-style-type: none"> - Classrooms integrated into Knowledge Building International Project, - Creating cultures of inquiry and evidence around contextualized phenomenon learning - Students partnered with peers in other areas for a comparison of local challenges <p>Intermediate Outcomes</p> <ul style="list-style-type: none"> - Students research challenges of common theme through classroom work in the Knowledge Forum™ - Data on student participation in knowledge-building activities recorded for analysis. <p>Long-Term Outcomes</p> <ul style="list-style-type: none"> - Students acquiring 21st Century skills, especially those related to critical thinking, collaboration, communication and creativity and master subject matter through a multidisciplinary learning approach - Teachers become effective facilitators of learning effective, at the complex intersection of navigating content and student cognition. - Development of learning communities - Evidence of reform-minded teaching supported by technology-rich learning environments - A paradigm shift in primary and secondary education for learning and teaching 	<ul style="list-style-type: none"> - Model sustained and expanded in CCSD - Increased enrollment in UNLV COE - Evidenced acquisition of 21st Century skills <p style="text-align: center;">↓</p> <ul style="list-style-type: none"> ♦ Narrows achievement gaps and gender gaps ♦ College Readiness ♦ Increased Graduation Rates ♦ Relevant learning ♦ Decreased Drop-Outs ♦ 21st Century Skills/4C’s ♦ Supports ELLs/special needs ♦ Global Competences ♦ Students acquire skills for lifelong learning <ul style="list-style-type: none"> - Proactive relationships with schools to develop and model effective teaching and learning - Opportunities to study and implement research-based teaching practices, and results-driven instruction - Increased number of high-quality teachers, including those from under-represented groups - Increased collaboration between secondary education and higher education to increase college- and career-readiness <p style="text-align: center;">↓</p> <ul style="list-style-type: none"> ♦ Pathways to Higher Education ♦ Lessens need for remediation in college ♦ Contributes to college completion goals ♦ Educators acquire skills for lifelong learning/ICT competencies <ul style="list-style-type: none"> - A visionary and shared instructional leadership - A school culture conducive to professional development
PLANNED WORK			INTENDED RESULTS	

B. Significance of the Project and Needs

(B.1.) Exceptional Approach: An effective educator is one who has a lasting impact on students, embraces and masters technology to teach students born and raised in the digital age, and facilitates the acquisition of 21st Century skills for student success through the education process, in the workforce and in life. Effective educators are well-prepared to work in concert around a thoughtful, high-quality curriculum aligned to standards and supported by appropriate materials and assessments - elements that constitute a system that helps students to learn and educators to continue to improve. We looked at several model education systems in countries consistently at the top of international rankings of learning assessments such as PISA (Program for International Student Assessment) regarding reading, mathematics, and science literacy, and found they had built high-quality education system for their children in primary and secondary education by rethinking teaching and learning. They have drastically changed their education methods to introduce a curriculum based around "teaching by topic", where subject-specific lessons, such as Geography and History, are replaced by project-based learning, where students are taught cross-subject topics, such as climactic change, sustainability and economic trading zones that incorporate multi-disciplinary content. This "phenomenon learning" plus the effective use of technology for content delivery, learning assessments and the continued professional development of their educators - teachers, principals and support staff - is key to its success.

Utilizing technology effectively enables us to live, learn, and work successfully in an increasingly complex, information-rich and knowledge-based society. Technology can capacitate students within a sound educational setting to become proficient information technology users, information seekers, analyzers, evaluators, problem-solvers and decision-makers. They can become creative and effective users of productivity tools, communicators, collaborators, as well

as informed, responsible, and contributing citizens. Through the ongoing and effective use of technology in the schooling process, students have the opportunity to acquire important technology capabilities, with the key individual in helping students develop those capabilities being the classroom teacher. He or she is responsible for establishing the classroom environment and preparing learning opportunities that facilitate students' use of technology to learn and communicate. Consequently, it is critical that all classroom teachers are prepared to provide their students with these opportunities.

To prepare students for future learning and educational success, they will need to learn how to execute, monitor, and regulate the knowledge-construction process. By aligning the curriculum of the project-based learning in ALTE environments to standards, we value what content is learned; by supporting computer-supported collaborative learning environments, we also value how students engage in inquiry, enabling them to function as do professionals – scientists, business people, and community leaders – responding to real-world problems in learning communities similar to those in research and business. The model has been proven effective from over 30 years of research led by the Building Cultural Capacity for Innovation (<https://web.archive.org/web/20150215021806/http://ikit.org/bcci/>) - a multi-nation design research project with a practical application in classroom learning in over 17 countries around the world. The Catalonia (Spain) Superior Council of Education Evaluation recently evaluated the model on which ALTE was designed through a thorough and rigorous evaluation at the highest levels of the Ministry of Education, announcing it was the most innovative technology currently in use. Copies of the report are available upon request. Students engaged in ALTE classrooms are able to learn based on a broad set of competencies: seeking out information and researching answers to problems, learning to analyze oftentimes complex materials, and being

able to distinguish between useful and irrelevant material. Learning becomes relevant as students study common themes related to the real-world challenges their own communities face.

Students educated with the ALTE model use these skills to become independent learners, able to handle the challenges of academic study. Acquiring 21st Century skills will contribute toward students becoming “college ready”, able to succeed at a wide range of post-secondary institutions such as universities, community colleges and vocational training. Research shows that if students are prepared to succeed in college entry level courses, they will most likely be able to cope with the full range of college courses they can encounter throughout their academic studies. But in order to prepare students for college readiness, we cannot wait until children are approaching college age to prepare them for college success. We must start arming them at an early age with the skills and knowledge they will need for post-secondary education. K-12 teachers play a critical role in preparing their students with the skills they will need to be “college ready” and begin the path to becoming “career ready”, and the ALTE model constitutes tools K-12 educators need to facilitate the learning of knowledge and acquisition of skills that will prepare secondary education students for entry to higher education and the workforce, and to attain their college completion goals. The ALTE approach works to address the underlying issues related to effective education reform by:

- Giving students what they need to do well in school at an early age, as early as 2nd grade to help with the 3rd - 4th grade slump. This will lessen, if not completely close, the gaps among students in primary school that manifest themselves over the K-12 continuum.

- Contextualization through phenomenon learning presents information in an engaging way, which makes learning relevant to the student. The multi-disciplinary approach to learning and teaching positions educators as facilitators, coaches and mentors rather than transmitters of pre-

determined content. The Network for Teaching Entrepreneurship reports that 1 in 3 U.S. high school students drop out - 7,000 students every day or one student every nine seconds – mostly African American, Latino and Native American students. In the NTE survey, an overwhelming percent of dropouts report they would have stayed in school if it were relevant to their lives.

➤ Small group learning can help teachers identify and understand students’ weaknesses and shortcomings and serve as a technique to help student overcome them and progress in the learning process. It also helps with classroom management, self-directed learning and peer learning, and well as promoting socialization skills and the 4C’s of future education.

➤ A project such as C21CTL attracts and retains high-quality teachers who have been well-trained both in education pedagogy and the use of technology within school cultures that support visionary and shared instructional leadership and are conducive to professional development. Knowledge-building teachers meet and exceed standards outlined in UNESCO’s ICT CFT. Additionally, UNLV’s COE attracts a teaching force that is reflective of the demographics reflected in CCSD’s student population in terms of races and cultures.

➤ Knowledge building is based on collaborative learning that thrives on complexity and idea diversity, where all members of a learning community contribute theories regarding the solution to real-world problems. The objectives of the ALTE model bring knowledge building into students' efforts to solve societal problems and serve the public good, creating an effective way of acquiring important 21st Century skills while mastering content that is well grounded in science and the humanities. Simultaneously, educators are acquiring and mastering their own teaching skills, especially those aligned with the UNESCO ICT CFT. This framework outlines the competencies that teachers need to integrate ICTs into their professional practice, emphasizing the role that ICTs can play in supporting major education focus areas across growth

phases of knowledge acquisition, and leveraging ICTs in unique ways. It also provides a lens through which to integrate ICT into teacher training. ALTE mimics previously-mentioned high-quality education systems by transforming learning to ensure that what we are teaching and testing are important, reasonable and challenging to every student.

(B.2.) Contribution to Field of Study: Over the past 50 years, our society has transitioned from one that was industrialized and existed in isolation to one that is global and based in knowledge. Educators will need new pedagogies that contribute toward transforming the classroom into environments where students learn the skills and acquire the competencies they need to achieve academic success, and become productive workers and active citizens later in life. Technology has increased the demand for workers who have good STEM basics and can communicate effectively. Jobs will exit that are not even envisioned today. Tomorrow’s employees will need to think critically, solve problems, innovate, and collaborate in teamwork. The growth in information technology and changes in work organization have contributed to the rising demand for higher-order cognitive skills in workers. Given the increased autonomy and responsibilities in many work environments, “soft skills” – motivation, problem-solving skills, making contributions to the broader working environment, ability to accept and learn from criticism, etc. – have become very important skills sought in workers for the 21st Century labor market. And let’s not forget about globalization, that produces real gains for a country’s economy and prosperity, and has a real impact on wages and income of workers as a whole – and the corresponding need for employers to acquire a workforce that is multicultural and multilingual. After all, a workforce can be most effective when it mirrors a company’s clients and customers. Students – the nation’s future professionals – need to be skilled at learning quickly and on their own, in order to handle the challenges of academic study and demands of the labor market later in life. Attitudes and

behavior, including the ability to engage in study skills, time management, awareness of one's performance, persistence, and the ability to utilize study groups, are also required for college readiness and skills needed to succeed throughout the educational spectrum. The ALTE model facilitates these goals.

(B.3.) Project's Positive Impacts: With college- and career-readiness issues becoming key priorities for the PK–20 education community and the nation at large, today's teachers will need to be qualified to help their students be successful in learning – in a wide range of subject matters. This will form a springboard for them to continue to learn post-secondarily and acquire skills that will ultimately prepare them for the workforce and as productive citizens in society.

The technology-based pedagogy of the ALTE model does not obviate the need for teachers to serve as leaders, motivators and facilitators, and the role of the teacher in our project is of utmost importance. While traditional learning defines the role of the teacher as being primarily a dispenser of information, solely responsible for ensuring that learning occurs, knowledge-building pedagogy trains the teacher more as a facilitator of learning. In the computer-supported collaborative learning environments supported by the ALTE model, they become mentors and coaches of their students, who typically work in small groups, thus enabling them to manage the learning process more efficiently. In ALTE classrooms, a mainstream education class of 30 students using memorization techniques to learn for mandated testing is transformed into a knowledge-building class of 5-6 groups working collaboratively around ideas of subject matter aligned with the standards. Group members gain knowledge through constructivism techniques, critical thinking skills and self-directed learning. Their work supports deeper explorations and discovery of knowledge through project-based learning, with a higher level conceptualization that gives them greater explanatory power. In ALTE environments, students take over high

levels of social and cognitive responsibility. Additionally, student ideas that have an "out-in-the-world" application or are based in real world scenarios and not tied solely to personal knowledge or beliefs form the basis for creating knowledge that is accessible to an entire community, in our case a community of students learning in small groups. In knowledge building, it is referred to as "community knowledge" with the "community" referring to students learning in small groups.

C. Management Plan, Personnel and Technology

(C.1.) Tasks, Time Lines, and Responsibilities. Appendix I reveals the project's management plan, with an indication of meetings of project staff, consultants and advisory leadership team.

(C.2.) Qualifications, Training and Experience of Project Personnel

Appendix II defines staffing positions and identifies candidates to serve in C21CTL, along with their qualifications, training and experience, and a list of technology required.

D. Project Evaluation

The external evaluation will feature key tasks designed to address the need to collect and analyze (1) formative data on the implementation of the ALTE model, quantity of student participation and quality of classroom work on the Knowledge Forum™ and quality of multi-media presentations reflecting research conducted on the common theme. (2) summative data on technology use in the classroom, specifically knowledge-building methodologies, in contributing toward Instructional Practice that improves student learning and supports the professional development of K-12 teachers. We will match on multiple years of student outcome indicators to ensure that UNLV student teachers are on the same trajectory of improving student learning outcomes and academic achievement in an entire school district.

An implementation study will focus on three dimensions of implementation fidelity: *adherence* (presence or absence of core program elements), *quality of program delivery* (the

manner in which the program innovation is delivered), *and participant responsiveness* (the extent to which participants are engaged by and involved in the activities and content of the program innovation). Given that the ALTE model will be implemented in natural school settings, the focus on implementation fidelity will examine the ability of the intervention to produce positive results in actual use, as opposed to in ideal circumstances.

To evaluate *adherence*, we will combine information on the teacher's adherence to UNLV's COE's achievement guidelines and attendance at professional development opportunities supported by the KBCOP. These include regularly-scheduled videoconferencing with their partners, teachers reporting about the degree to which they were able to integrate the model to the curriculum and student support in the course over the school year and in subsequent school years during the term of the project, and student survey data on class work performed in the Knowledge Forum™ with production of multi-media presentations on the global project. To evaluate the *quality of program delivery*, we will combine information from the teacher survey (including teacher motivation, teacher engagement, and teacher pedagogical practices) and the student survey (regarding the content and engaging quality of the technology and resulting assignments). In addition to examining these elements separately, we will create indexes to measure the degree of quality on these multiple dimensions. Analyses will focus on the distribution in the degree of program adherence across the participating classrooms. Finally, to evaluate *participant responsiveness*, we will examine student perceptions of relevance and rigor in participating in the project and related digital assessments produced by the Knowledge Forum™. Evaluators will interview a sample of teachers and conduct observations of the classes, guided by a standard observation protocol informed by lesson planning strategies. Evaluators will have access to the analysis of student profiles maintained in the Knowledge

Forum™ (e.g., activities completed, amount of time engaged in activity, focus of activity, exercise progress over time) that have been anonymously labeled for student privacy issues.

The research team will hold a debriefing meeting after the qualitative data has been collected to discuss common themes observed on-site and to identify patterns in the data by comparing and contrasting what was learned from each site. After examining alternate explanations for the data patterns, the team will generate assertions from the qualitative data and provide illustrative examples of school conditions and classroom implementation to support the assertions.

E. Dissemination Plan

World FATE will schedule a presentation of the project's results at each of their next three conferences. An ongoing integrated social media campaign will present results of the project and engage an external audience to stimulate support among a wide array of targets, including leaders in public education, public policy, higher education, the private business sector, and others. Information and results of the project will also be widely disseminated at appropriate educator events such as national conferences where topics are particularly valued. The project will also submit at least two articles to peer-reviewed publications or journals in English and one in Spanish, and regular submission to the various publications and dissemination mechanisms of the C21CTL partners is anticipated.

Collaboration for 21st Century K-12 Teaching and Learning (C21CTL)

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