

# “Big Ideas” Funding Proposal One-Time Non-Base Investment Proposal: Step 2

*(Please limit the proposal narrative and attachments to 10 pages)*

Proposal Name: Avatars to Teach our Teacher Candidates

1. Provide a description of the project being proposed. (5 points)

Monique, the eager-to-please girl with the chirpy alto, is raising her hand again. But I’m more interested in drawing Maria -- who hides in the back row and avoids eye contact -- out of her shell.

“She don’t wanna talk to you, man,” says Marcus, confidently flip as usual. “She don’t talk to anybody.”

Vince, the pallid kid with dark hair who sits at Marcus’s left, chuckles -- just like he did earlier when Marcus told me he “found” the Mercedes-Benz hood ornament, now draped around his neck, “in the parking lot.”

So I try engaging Francis, the shy but willing young man in camouflage shorts and a T-shirt. I ask him what he wants to learn about. “Uh ... music,” says Francis, before launching into a beat-boxing exhibition that he says he learned from YouTube. I compliment him on the routine. Noting this, Monique raises her hand with redoubled urgency.

Although, the dialogue above may sound like a typically middle school classroom, it’s not; their virtual. The students and the classroom are part of the TeachME™ (Teaching in Mixed-reality Environments) simulator out of the University of Central Florida (UCF)’s Institute for Simulation and Training and its SREAL research lab. Each virtual student is programmed with distinctive personalities. So they can choose to answer math questions posed by the teacher. They also can make snarky comments and funny noises and bang on their desks, behavior that can be ramped up to shouting level at the touch of a control pad operated by professors observing the teacher candidate.

Here’s how it works: The teacher candidate stands in a room in front of a projection screen depicting five students in two rows. The student avatars are being controlled by “interactors” -- acting students from UCF, who have studied the behavior of the students they are embodying. Unlike other simulators, this is interactive and real time, allowing the teacher candidate to interact, and respond to the student avatars in real time. The presence of human interactors eliminates the parameters that would make an artificially intelligent simulation a poor training tool for actual classroom teaching; teaching is not a scripted activity.

The interactors doing the live sessions can see and hear the teacher candidate via Skype. A second puppeteer, controls a series of knobs that can prompt non-speaking outbursts, such as giggling or, in Francis’s case, beat-boxing. The interactors can escalate or de-escalate the level of behavioral responses depending on the teacher candidate’s interaction. For example, if the teacher candidate tries punishing minor disruptions the controls can be cranked up to chaos in the classroom. The simulation team at UCF can customize the look of the students to reflect varied classroom demographics, offering developing teachers genuine and broad opportunities for experience.

Teacher candidates typically learn the real ins and outs of managing a classroom on the job. This can be nerve-racking. The virtual classroom allows teacher candidates to try new techniques without involving real students, but rather avatars or virtual students.

The College of Education seeks to collaborate and form a partnership with the University of Central Florida (UCF) to deploy and improve the virtual classroom (TeachME). We would pilot this project with students enrolled in the Graduate and undergraduate programs in the Educational Studies: K-12 and Secondary department. Students enrolled at beginning of the program (level II), will be provided access to TeachME. After the pilot, TeachME could be expanded to include the elementary and special education programs.

2. Describe how the project will drive positive transformational change. (5 points)

The immersive technology tool provides a unique method of teacher training in an environment which does not put actual children at risk while allowing teachers to hone their skills. If a teacher candidate is consistently rattled by the chaos that may be present in the virtual classroom, that person might be advised to pursue another career. Likewise, if a teacher candidate provokes chaos and exhibits no empathy or remorse, that person might not have what it takes either. And for teacher candidates who have what it takes but also have plenty to learn about teaching in practice, TeachME affords them the perfect environment in which to make mistakes.

3. Explain how the project addresses student recruitment, retention, persistence, and/or completion or one or more of the 12 Challenges. (10 points)

This initiative directly supports several of Minnesota State Mankato's strategic priorities.

- Change the world by collaboratively addressing our planet's most challenging problems.
  - Teacher effectiveness is one of the most critical challenges in K-12 schools and the wider society currently in the U.S. U.S. lags behind other industrialized countries in educational comparisons in academics. Almost half of the teachers quit during the first five years of teaching. Our initiative makes teachers better prepared for the realities of managing classrooms so that teachers are prepared to provide a learning environment where learning can take place.
- Greatly expand the reach of our extended learning programs.
  - Our initiative fully utilizes the capabilities of instructional technology and can enhance learning experiences for on-campus students as well as attract more online students by providing a robust technology for authentic learning via technology.
- Measure and continuously improve our work to ensure excellence in all that we do.
  - Our initiative will have rigorous pre- and post-measures for assessing student learning.

In addition to the above strategic priorities, our initiative directly addresses the following "challenges" presented by President Davenport:

**Enrollment Management, Graduation, and Advising:**

Our initiative is designed to serve a function of a support system for MSU students learning to be teachers. The system is customizable based on students' needs and thus will enable each student to work at their exact level of optimal learning. This tailored and differentiated support will significantly enhance student persistence and graduation.

**Graduate Studies and Research:**

An integral part of the initiative is to identify research questions, collect and analyze data on the

effectiveness of the methodology in relation to MSU students' persistence in the program and their effectiveness as teachers during student teaching and into their careers. The proposed technology is ground-baking in the nation and in the state of Minnesota and will yield many opportunities for leading research efforts on the national stage.

4. Describe the impact this project will have on students and/or others whom we serve. (10 points)

a. Eliminate the trial-by-fire approach:

Environments for teacher training often include field experiences, microteaching experiences, and internships. These are widely used and accepted methods for training prospective teacher candidates for the classroom, yet teachers in their first years of teaching often face difficulties related to classroom management. The TeachME project has the potential to revolutionize teacher training by effectively eliminate the trial-by-fire approach to classroom-management training, and replace it with something more instructive and less dangerous.

The realistic aspects of the virtual environment can enhance teacher candidates' preparation for classrooms. The incorporation of the virtual classroom in complement to other environments provides for multiple experiences which can focus on both mastery of content and its delivery as well as behavior management strategies which can be effective in schools.

b. Novice teachers:

More importantly, it could limit the students' exposure to underprepared, ineffective teachers. The virtual classroom so real-seeming that it could drastically improve how prepared novice teachers are by the time they venture into the blackboard jungle as student teachers -- and in so doing, reduce teacher turnover by weeding out likely candidates for burnout.

c. Attrition:

Given high teacher attrition and turnover in public school setting due to difficulty managing classroom behavior (Swan, 2006; Veenman, 1984; Hollingsworth, 1988), can the implementation of the TeachME project reduce this? The realistic aspects of the virtual environment allow teacher candidates to focus on both mastery of content and its delivery as well as behavior management strategies prior to student teaching.

d. Student learning:

With inadequate management of student behavior the content knowledge of the teacher candidate becomes irrelevant. This begs the question as to whether there may be an additional method for teacher training with could assist beginning teacher candidates, particularly in classroom management and thus improve student learning.

According to Lisa Dieker, coordinator of the special education program at Central Florida's college of education, we can prove it changes teacher practice, but longer-term studies will be necessary to see whether the students in classes taught by TeachME-trained teachers actually learn better, and whether that success gap can be traced to the TeachME system.

e. Digital Immigrant educators:

Theoretical Framework According to Prensky (2001), our education system fails to teach today's students, growing up with new technologies, and the biggest problem facing education is educators, who are Digital Immigrant educators, who speak an outdated language to today's students, who are Digital Natives, native speakers of new

technologies. New technologies are integral parts of our students' lives, and we as educators must use emerging technologies in our teacher education programs to prepare prospective teachers for diverse classrooms.

5. Identify the "SMART" outcomes for the project (specific, measurable, achievable, relevant, and time-bound). (5 points)

- a. Our teacher candidates will be better prepared in the area of classroom management and dealing with student behaviors – this will be tracked in student surveys given prior to and at the end of student teaching, one year out of college and teaching, and from employee surveys. Since this will be implemented at the beginning of the teacher education program, the impact of this project will be three to four years away.
- b. Our teacher candidates will change their practices and approaches when managing students with behavioral problems and/or when students are off task. Students will be observed and asked to reflect on their experiences.
- c. Our teacher candidates will have a positive impact on student learning. Longer-term studies will be necessary to see whether the students in classes taught by TeachME-trained teachers actually learn better, and whether that success gap can be traced to the TeachME system.

6. Discuss what this project will do for the university that warrants the investment. (5 points)

The virtual classroom sharply differs from other teacher training environments (e.g. microteaching). Rather than focus on teacher content, the virtual environment allows for a focus more on managing student behavior in order for delivery of content to occur. The students are real, sometimes disrespectful, unmotivated, and unenthusiastic. The teacher candidates cannot rely on anyone but themselves for delivery of content and the added component of behavior management.

The virtual classroom can expose our teacher candidates to many more potential conflicts in less time than it would take to live through them in a real classroom. As teachers become more experienced, they learn to cope and deal with those smart, quiet students who fade into the background.

Accentuating traditional training approaches with simulated ones can improve the learning experience for students by providing multiple experiences. Providing a realistic classroom and student behavior experience offers new opportunities for teacher educators to focus on both mastery of content and its delivery as well as develop management and problem resolution skills which can be effective in schools.

According to Prensky (2001), our education system fails to teach today's students. New technologies are integral parts of our students' lives at Minnesota State Mankato. We, as educators must use emerging technologies in our teacher education programs to prepare prospective teachers for diverse classrooms.

7. Describe how the activities generated by this project would be sustained after one-time funding has ended, or if applicable, explain why the project does not need to be sustained. (5 points)

Once the cost of hardware and the one year pilot has been funded, this project will continue through matching funds offered through the College of Education and Educational Studies: K-12 and Secondary department. The overall goal of this project is not only to be sustained, but potential expand to include other departments.

**Budget (5 points):**

Outline the funding requested using the categories listed below. Please identify any additional or matching funds that may be available to support the project. Please note, budget revisions beyond 10% total change from the initial proposal require approval. Budget revisions of more than 20%, constitutes a major change in the project scope and will not be approved.

There is no need to build new labs on location; the teacher candidates at Minnesota State University, Mankato can access the virtual classroom on campus.

	FY12	FY 12 Matching Funds	FY13	FY 13 Matching Funds	FY14	FY13 Matching Funds
<b>Personnel</b>						
Unclassified Salary (in-load, overload)						
Classified Salary						
Fringe <sup>a</sup> (Classified and Unclassified)						
Graduate Assistant Salary						
Graduate Assistant Tuition Reduction/Waiver <sup>b</sup>						
<b>Non-Salary</b>						
Student Help		\$6,000		\$6,000		\$6,000
Purchased Services/Travel Expenses	\$12,000	\$6,000	\$12,000	\$6,000	\$12,000	\$6,000
Supplies and Materials						
Building Improvement/Construction Costs						
Equipment	\$7,000					
<b>Total Budget Requested</b>	<b>\$19,000</b>	<b>\$12,000</b>	<b>\$12,000</b>	<b>\$12,000</b>	<b>\$12,000</b>	<b>\$12,000</b>

<sup>a</sup>Note: All current employees must be paid fringe benefits. Fringe should be estimated based on salary and position classification: Unclassified 30%, Classified 37%, Adjunct 7.65%.

<sup>b</sup> Estimated Tuition Reduction/Waiver for full-year enrollment: Masters \$5,858, Doctoral \$10,000.

**Costs:** From a hardware perspective (see table below), the system is theoretically inexpensive. Estimates for the hardware would cost about \$5,000 to \$7,000, and we would probably own many of the necessary components already.

100 hours of access to the virtual classroom may be purchased at \$12,000

<b>Equipment</b>	<b>Description</b>	<b>Needed</b>
Headset	Sennheiser RS 120 926 MHZ wireless RF (or similar)	
Speaker	Yamaha MSP3 (or similar) – these are mounted in the ceilings of the room and may need to be relocated.	No
Webcam	HP NX252AA 2.0 M Effective Pixels USB 2.0 Business (or similar)	
Projector	Viewsonic PJD6211 (or similar) – this is mounted in both rooms	No
Rear Projection Screen	Da-Lite's Fast-Fold Deluxe Ultra Wide Angle 54" by 74" – both rooms have a smart board	
Workstation and Monitor	Dell XPS series, NVidia graphics card, monitor, keyboard, mouse, high speed networking (or similar) – the rooms are networking built in each	
Cameras	Optitrack Flex: V100R2	
Headset mounted marker	Marker bases: 1" tall; reflective markers: 7/16" hard	
Camera USB cabling	USB 2.0 Hub 7 – Port D-link; USB cable: 16 ft A to B; USB cable high grade: 3 ft	
Camera Mounts	2 Pelco C10-UM Universal Camera Mounts	
Motion4u tracking license		
Erodex	Ergodex DXI	
Misc	Cables, power strips, table (4' x 6') and small desk for operator/instructor	

The interactors currently bill at about \$120 per hour or \$12,000 for 100 hours.

9. Identify any special considerations or needs required for this project (e.g. physical space, contractual obligations, IT support, or collaborations with/implications for other units). (5 points)

**Physical Space –**

Armstrong Hall 321e: converting from a conference room into a virtual classroom. The equipment and space needed for the virtual classroom is ideal. There would a need for some additional equipment (cameras, microphone, and control panel), and relocation of some equipment (speaker(s)) and removal of conference table and chairs. This would be the first choice, allowing the most access for students to use the virtual classroom. Or

Armstrong 309: adding the capabilities of a virtual class to the existing classroom. This would require some additional equipment (cameras, microphone, and control panel), and relocation of some equipment (speaker(s)).

**Contractual obligations –**

A partnership would be entered into with the University of Central Florida – within the contract the College of Education/ K-12 and Secondary department would need indicate the amount of time purchased/per year and access times per semester. The cost is \$120/hour or one hundred hours may be purchased for \$12,000.

**Special considerations –**

In additional to the physical space and contractual obligations, IT support and collaborations with other departments and colleges for use of the virtual classroom.

10. Provide a project timeline outlining key tasks, milestones and dates for completion. (5 points)

**Timeline:**

**Fall 2012**

March – April: Review, approve and sign partnership agreement with University of Central Florida (UCF).

March – April: Place work order in for room improvements in either Armstrong 312e or 309.

March – April: Order necessary equipment with ITS (some of the equipment we have in place in the room and therefore should reduce the budget for equipment).

May – June: complete work on room improvements.

May – June: Purchase 100 + hours and develop a schedule for fall and spring use of the Virtual classroom. Develop a plan for implementation and data collection (see below for an example).

June – July – August: test the virtual classroom with UCF.

August - September: Faculty and student training.

September – October – November: Teacher candidates begin using the virtual classroom

September – October – November: Collect data.

November – December: Analysis data and make improvements.

**Spring 2013**

January: Purchase additional time if needed and revise the schedule for spring as needed.

January: Test the virtual classroom with UCF.

January: Faculty and student training.

February – March – April: Teacher candidates begin using the virtual classroom

February – March – April: Collect data.

April – March - May: Analysis data and make improvements.

**Milestone:** April – May 2012 a report based on the data collect will be developed and shared with the department. Based on the report, modification will be suggested and implemented as needed.

**Fall 2013**

May – June: Purchase 100 + hours and develop a schedule for fall and spring use of the Virtual classroom. Revise the plan for implementation and data collection based on the data.

August: Test the virtual classroom with UCF.

August - September: Faculty and student training.

September – October – November: Teacher candidates begin using the virtual classroom

September – October – November: Collect data.

November – December: Analysis data and make improvements.

#### Implementation and data collection (draft)

- 1) Situate the learning experience: The teacher candidates will work in groups of three (as content allows). Each group will plan and write a detailed lesson plan for the same problem/issue or subject matter. For example in math the group will be given the same algebra problem, an algebraic problem involving generalizing a non-linear pattern;
- 2) The topics or subject matter will increase complexity: Teacher candidates will be provided with correct, incorrect, and incomplete student work samples to the problem/issue for which they wrote lessons, and ask them to discuss these work samples;
- 3) Involve learners in responding to a set of increasingly complex inquiries about the problem situation: After each virtual session, each group member will write a reflection based on his/her role in the teaching (i.e., teacher or observer), then watch their own videos and revise their lesson plans in preparation for the next cycle of teaching;
- 4) Challenge learners to develop decision-making rules and guidelines for a variety of unanticipated situations: In an attempt to help the prospective teachers develop appropriate solutions and strategies for challenging student behaviors in a virtual environment.

#### References:

Hollingsworth, S. (1988). Making field-based programs work: A three-level approach to reading education. *Journal of Teacher Education*, 39(4), 28–36.

Prensky, M (2001), *Digital Natives, Digital Immigrants*. On the Horizon, University Press, 9(5).

Swan, B. (2006). *Middle School Teacher Preparation and the Effects on Teacher Attrition and Student Mathematics Achievement in a Large Urban District*. Unpublished doctoral dissertation. London: Falmer Press. University of Central Florida.

Veenman, S. (1984). Perceived problems of beginning teachers. *Review of Educational Research*, 54(2), 143-178.