WIU-QC Learning Assistants Proposal

I. Introduction: Summary Statement

The WIU-QC HLC Persistence & Completion Academy Team seeks to pilot a Learning Assistant Model over 3 years in 4 of the College of Arts and Sciences courses that support the engineering program on the Quad Cities Campus. The four courses are Math 133 and 134 and Phys 211 and 213. Learning assistants are high performing undergraduate students with an aptitude for teaching and are employed in the classroom to facilitate active learning environments. The use of learning assistants have been shown to increase student learning, increase student retention, increase student engagement, emphasize reasoning and help instructors learn more about student thinking.[1]

In order to implement this 3-year pilot, the Quad Cities College of Arts and Sciences requests $10,500 per year from the money donated by The Moline Foundation and John Deere Foundation for three years to conduct the pilot.[2]

II. Statement of Need

According to a 2014 Department of Education NCES report, "producing sufficient numbers of graduates who are prepared for science, technology, engineering and mathematics (STEM) occupations has become a national priority in the US."[3] According to the Joshua Wright, of Emsi, a labor market analytics firm, demand for Engineers has seen double digit growth in recent years, the most coming among mechanical engineering. Occupations with an older workforce have the potential to experience labor shortages. In 2014, 23% of all engineers in the workforce were 55 years old or older, compared with an average of 19% across the US workforce as a whole. [4]

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[1] P.E. Beal (1980), *Learning Centers and Retention*. In O.T. Lenning & D.L. Wayman (Eds.) *New Roles for Learning Assistance* (pp. 59-73). San Francisco, CA:Jossey-Bass. And M.P.Ryan & P.A. Glenn (2004) What do First Year Students Need Most: Learning Strategies Instruction or Academic Socialization? *Journal of College Reading & Learning*, 34(2), 4-28.

[2] Money donated to WIU by these foundations was intended to support enrollment growth in the College of Business and Technology and the School of Engineering at the WIU-Quad Cities Campus.

[3] STEM Attrition: College Students' Paths Into and Out of STEM Fields, US Department of Education Statistical Analysis Report, 2014. https://nces.ed.gov/pubs2014/2014001rev.pdf

[4] The Most In-Demand (And Aging) Engineering Jobs. *Forbes*, 9/12/2014. http://www.forbes.com/sites/emsi/2014/09/12/the-most-in-demand-and-oldest-engineering-jobs/#466be3454b4a

The engineering program is one of Western Illinois University's Signature Academic Programs. It is a high demand program that is ABET accredited. Additionally, WIU has the only engineering program in the western region of Illinois. The need for this program is evidenced by the financial support shown to the university, specifically for engineering by companies and organizations in the Quad Cities area. Since the program began, 16 major donors have donated a total of $1,848,500.00 to support its growth. Companies in the Quad Cities support the program in other ways as well, such as by hiring recent graduates, providing internship projects for current students, and serving as mentors.

Because of the national and regional need, and the local investment, the growth and success of the engineering program along with the completion rate of the students in the program is important. However, as is the case in some other engineering programs across the country, WIU-QC engineering students have experienced a lower-than-desirable first-to-second year retention rate. Table 1 shows data for the WIU-QC engineering cohorts for the years indicated.[5] Table 2 shows data for all students in the WIU-QC Campus cohorts for the years indicated. Acknowledging the small sample size shown below, there is nonetheless a strong correlation in Table 1 between average transfer GPA, course deficiency at final grade percent, and percent retained to second year.[6]

TABLE 1

Cohort Term	Total Students	Average ACT	Average Transfer GPA at Entry	Course Deficiency at Final Grade Percent	Average WIU GPA after First Semester	Percent Retained Second Year
Fall 2013	49	24.4	3.036	27.66%	2.455	63.27%
Fall 2014	45	25.1	3.065	19.55%	2.722	66.67%
Fall 2015	23	25.7	2.952	30.77%	2.554	47.83%
Fall 2016	22	25.9	3.228	16.00%	3.086	0.00%

TABLE 2

Cohort Term	Total Students	Average ACT	Average Transfer GPA at Entry	Course Deficiency at Final Grade Percent	Average WIU GPA after First Semester	Percent Retained Second Year
Fall 2013	321	22.4	3.047	16.50%	2.915	74.38%
Fall 2014	267	23.1	3.040	17.79%	2.809	70.41%
Fall 2015	257	21.9	2.898	27.08%	2.621	68.87%
Fall 2016	213	22.7	3.023	17.84%	2.870	0.00%

[5] For Table 1 and Table 2, the data was obtained from the Pentaho Data Warehouse Analysis Tool. Filters used were Campus includes Quad Cities, Major at Entry includes engineering, and Cohort Term includes falls 2013, 2014, 2015, and 2016.

[6] There is a strong correlation between average transfer GPA and percent retained to second year using only falls 2103-2015 (r-squared = 0.99369). There is weaker but still apparent correlation between average transfer GPA and course deficiency at final grade percent (r-squared = 0.82339).

The goal of the Learning Assistants Pilot Proposal is to increase the success of students in 4 of the co-requisite first year engineering courses, Math 133, Math 134, Phys 211 and Phys 213. Table 3 below shows the percentage of students who successfully completed Math 133. Parallels can be drawn between the lower success rate in Math 133 in fall 2015 and the lower first-to-second year retention rate of that same cohort.[7] Table 4, which shows data for Phys 211, also shows a decline in success rate for the fall 2015 cohort but as success rates rose in Math 133 they also rose in Phys 211.[8]

TABLE 3

Cohort Term	Total Students enrolled in Math 133	Percent of Students who Completed Math 133 with a C or better
Fall 2013	7	71.40%
Fall 2014	18	61.10%
Fall 2015	14	35.70%
Fall 2016	16	56.25%

TABLE 4

Cohort Term	Total Students enrolled in Phys 211	Percent of Students who Completed Phys 211 with a C or better
Fall 2013	no data	no data
Fall 2014	26	80.80%
Fall 2015	18	61.10%
Fall 2016	20	80.00%

This proposal acknowledges that there are multiple causes for attrition for first year student and that not all of them are related directly to academics. However, Western Illinois University-Quad Cities is not unique in its struggle to retain engineering students either within the major or in the university. A recent article in *Higher Education Studies* calls attention to the fact that low enrollments and high attrition rates in all STEM fields are challenges at institutions all across the country.[9] The authors referenced a recent study by Noel-Levitz that showed that 45 percent of incoming freshmen had significant problems with mathematics, a central competency of

[7] R-squared = 0.807492

[8] For Table 3 and Table 4, the data was provided by the faculty teaching the courses and is based on 10th day enrollment.

[9] A. Sithole, E. Chiyaka, P. McCarthy, D. Mupinga, B. Bucklein, L. Kibirige, Student Attraction, Persistence and Retention in STEM Programs: Success and Continuing Challenges, Higher Education Studies, 7:1 (2017). http://www.ccsenet.org/journal/index.php/hes/article/view/65810/35575

engineering.[10] In a 2014 study J. Sklar found evidence of a strong relationship between high first-year college GPA and low graduation risk among STEM majors.[11] The same study also suggested a need for institutions to focus more attention on freshmen.

More than 15 years ago, Wright State University noticed a need to address its low persistence rates in its engineering program. In 2004 they piloted a new math course aimed at first-year engineering students with the simple goal of increasing student retention. By intervening in the math course, Wright State has seen a positive impact on both graduation rates and GPAs among engineering students. The success of this intervention has led to a subsequent pilot of this model at another university.[12] These are just a few examples of studies that, while not exactly what WIU-QC proposes to pilot, show interventions in freshmen math to be the best place and method to improve retention and graduation rates among engineering students.

The Learning Assistants Pilot Proposal fits well with WIU's missions and values. The mission is for WIU to provide student-centered programs characterized by innovative teaching. It also states how WIU engage students in educational opportunities in collaboration with community partners. The Learning Assistants Pilot Proposal, as explained in detail below in Goal 1, seeks to transform the Quad Cities sections of Math 133 and 134 and Phys 211 and 213 from lecture-based courses into more collaborative student-centered learning environments with the use of learning assistants. WIU's values of *Academic Excellence*, *Educational Opportunity*, *Personal Growth*, and *Social Responsibility* are also reflected in this proposal. The ultimate goal of this pilot will be to improve student success by improving access to the engineering program for students who experience difficulties in the freshmen-level math and physics. By providing increased support, Quad Cities team also see this proposal as a personal growth and social justice initiative which will help more women and minority students succeed in the engineering program.[13]

III. Detailed Description of the Learning Assistants Model

The University of Colorado Boulder implemented a Learning Assistants Program in the department of physics in 2003. The model was based on a long tradition of academic success programs that have existed in US universities for centuries, as well as contemporary research that showed success in many different programs. The University of Colorado Boulder model has since been implemented in many of the STEM introductory courses, as well as select upper division STEM courses and some courses in the humanities and social sciences. The program leaders have accumulated evidence that their program positively impacts learning for the

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[10] Ruffalo Noel Levitz, 2013 National Freshman Attitudes Report, https://www.noellevitz.com/papers-research-higher-education/2013/2013-national-freshman-attitudes-report

[11] Sklar, J. (2014). *The impact of change of major on time to bachelor's degree completion with special emphasis on STEM disciplines : A multilevel discrete-time hazard final report*.

[12] http://commons.erau.edu/cgi/viewcontent.cgi?article=1292&context=publication

[13] According to 2014 journal article found at http://www.dl.begellhouse.com/journals/00551c876cc2f027,4642d6180815f6b2,72c4779527a629bc.html the self-efficacy of women, as well as African-American and Hispanic students is lower than that of White men in STEM classrooms.

students in the learning assistant-assisted courses, that it positively impacts student retention, and that it dramatically increases the rate at which the program enroll teacher licensure candidates.[14]

This program has spread beyond the University of Colorado Boulder and been implemented in various forms at 91 universities and colleges across the country. According to the CAS Professional Standards for Higher Education's context statement on the Role of Learning Assistants Programs, learning assistants programs share common goals of, "assisting students to achieve their academic goals, meet the expectations of their instructors and requirements of their degree programs, and succeed on standardized exams." In order for this type of program to be successful, according to the same source, the learning and development of the student staff (the learning assistants) is as important a part of the program as the student clients (the students taking the four courses covered by this proposal).

The model to be implemented at WIU-QC consists of three major components, detailed below. Each of the 3 components depends on the other 2, so that they form a basic unit of the program. The target audience for the program is students enrolled in Math 133, Math 134, Phys 211 and Phys 213. These course are the required entry courses to the engineering major. More importantly, these are the courses that provide the foundational skills needed for success in the engineering program as well as other STEM programs. At WIU and elsewhere, students in STEM programs typically experience the most difficulty in the lower level courses. The learning assistants' involvement in the classroom helps to support capable but at-risk first year STEM students by transforming the course into a more active learning environment.

The first component of the proposed WIU Learning Assistants Program is a pedagogy course, in which first-time learning assistants are exposed to models of learning and instruction, with a focus on methods of questioning and engaging learners in their learning. The pedagogy course implemented in the pilot will be 1 s.h. and involve general and content specific readings focusing on math and science pedagogy, with weekly projects drawing from the learning assistants' experiences in the classroom. The proposed learning goals for this course are for students to be able to reflect on their own learning, develop their own views on teaching and learning, make connections to relevant educational theory, be able to listen to students' questions and concerns and then be able to take action to address them. A number of detailed syllabi for this pedagogy course are available online.[15]

This is a course that learning assistants must take once during their first semester as a learning assistant. During the 3-year pilot, Dr. Rabchuk would teach the course as part of his contract as assistant dean for the College of Arts and Sciences. In this pilot, the Quad Cities team is proposing to provide the 1 s.h. course to the students at no cost to the students. Offering the course for 0 s.h. was considered but rejected because of the level and amount of work that is required in the pedagogy courses to educate effective learning assistants.

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[14] University of Colorado Boulder, Learning Assistant Resource site, Research, https://sites.google.com/a/colorado.edu/la-resources/sustain/data-slides

[15] University of Colorado Boulder, Learning Assistant Resource site, Pedagogy, https://sites.google.com/a/colorado.edu/la-resources/implement/pedagogy-course

The proposal is for the university to assess tuition and fees as they would for any other 1 s.h. course. The students would be awarded a scholarship (not a tuition waiver) for an equivalent amount to be paid from the money requested to launch this 3-year pilot. The current tuition and fees for 1 s.h. is $309.38 for the Quad Cities Campus. For 4 students per semester, this would cost $2,475.04. See attached financial worksheet for more details. The money to pay for the scholarships is included as a cost of the program on the financial worksheet because it's a cost to run the pilot. However, because the money is being used as a scholarship to cover the tuition for this course, it will also appear as tuition and fees revenue to the university.

The 1 s.h. course, taught as an independent study focusing on the Science of Learning, would be offered in the fall semester out of Physics Department during the pilot. If the pilot proves successful, a future version of the course could be offered as a Curriculum & Instruction course. A new financial assessment would need to be created at that point, but would also include income gained from improved retention of students in the engineering program. The fall section of the pedagogy course would be open to any student who wishes to take it but would be a required course for all new learning assistants. A spring section would be offered if new Learning Assistants are recruited for the spring courses or if demand from outside the learning assistants program justified the offering.[16] Learning assistants would be given priority to enroll in the course but others who might be recruited to take the course might be graduate assistants, AmeriCorps volunteers, academic student workers, and students interested in the science of learning.

The second component is a weekly planning session between the instructor and the learning assistants in the course. This is a time for the instructor to articulate the goals for the course during the week, to help plan how the learning assistants will interact with the students in the class, and also provide an opportunity for the learning assistants and the instructor to reflect on the previous week's lessons. This is where the learning assistants will have an opportunity to take what they've learned in the pedagogy course, and think about how they might apply those ideas in the context of their particular course assignment. It is also an opportunity for the instructor to use the learning assistants and their training to reflect on his or her instructional style.

For the pilot, Susan Brooks and James Rabchuk would be the Instructors for Math 133 and 134 and Physics 211 and 213 on the Quad Cities Campus, respectively. They would conduct the weekly planning sessions with their learning assistants in both the fall and spring semesters of each year.

The third component is the learning assistants' actual course assignments and their practice of what they have learned. The learning assistants work with the faculty to create a student-centered environment in the classrooms. One example of a learning assistants model in practice is in a where an instructor introduces a concept, and then poses a problem to the students, giving

[16] The financial details include the costs of 4 Learning Assistants taking the pedagogy course in the fall and 4 additional/new Learning Assistants taking the pedagogy course in the spring. It is possible that some or all of the Learning Assistants from the fall semester may be employed at Learning Assistants in the spring.

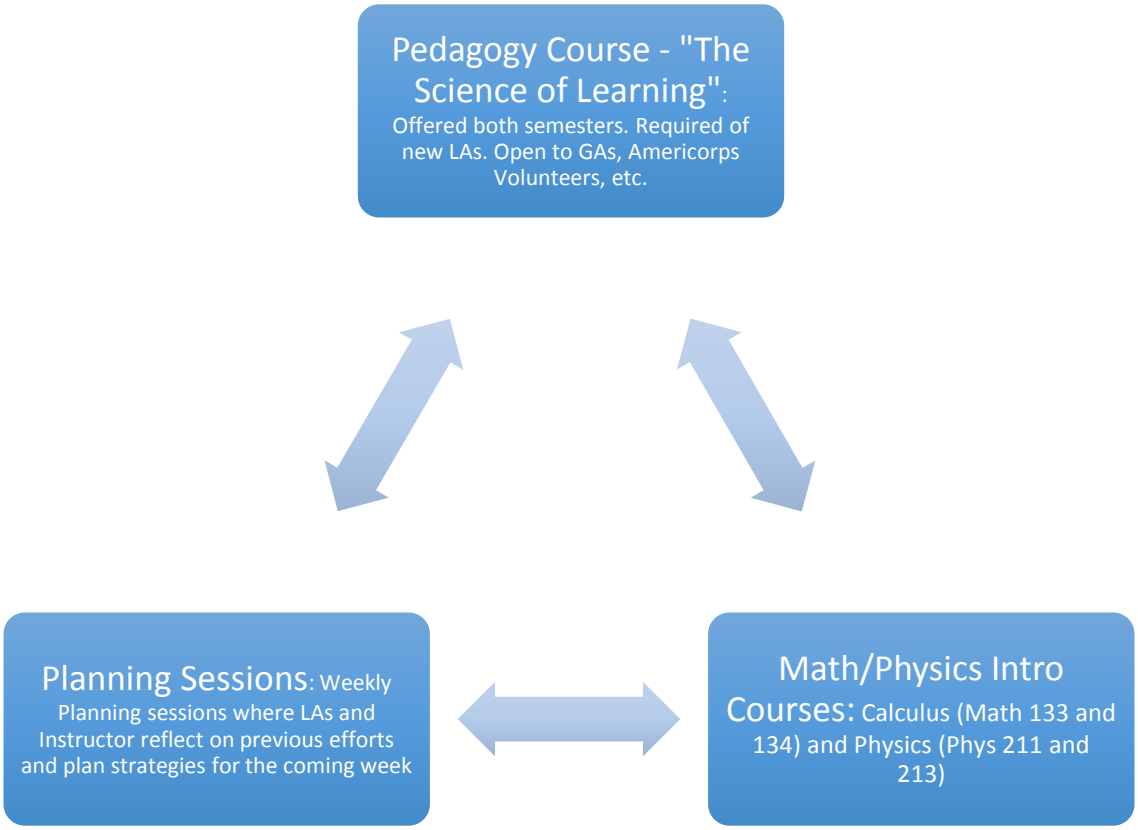
them time to complete the answer. During the student problem-solving time the learning assistant circulates among groups of students asking them to share their reasoning and probing their responses. Rather than confirm answers, their role is to help students articulate their ideas and justify their reasoning.

The learning assistants are not to be graders or merely to provide other types of traditional "help" to the instructor. They are to be engaged with the students during the class so as to facilitate active learning by the students. Even given this restriction, the learning assistant's role can vary widely. The example given above is just one of many possible ways learning assistants can improve student success. It is the experience of the coordinators and the learning assistants at the University of Colorado Boulder that this component is greatly enhanced when more than one learning assistant is assigned to a class. This provides opportunities for mutual encouragement and assistants, and improves the collaborative nature of the learning assistant-guided classroom. That is the reason behind this proposal's requirement of having 2 learning assistants per course or 4 per semester.

Compensation for the learning assistants: The second and third components of the program consist of hours worked by the learning assistants for which they will need to be compensated. The learning assistants are expected to meet with the course instructor 1 hour per week, have 1 hour of preparation for the course, and spend 4 for the Math course and 6 hours for the Physics course in the classroom/lab for the course assigned.

Each learning assistant will be compensated $9.55 per hour which is consistent with the student worker job category for tutors (category 4001). This level of compensation was chosen because learning assistants, with their pedagogical training and their previous success in lower level STEM courses fits the description of Level IV student workers. These are students with specialized skills or training, including tutors, who earn a wage over $9.50 per hour.

The total annual cost for learning assistant wages will be $8,022.00 (4 Math and 4 Physics learning assistants working 6 or 8 hours per week respectively, for 15 weeks each semester at $9.55/hour. Of the 91 institutions that have a Learning Assistants Program, 45 of them offer the learning assistants wages rather than a stipend for their work.



IV. Financial Justification

The 3-year *Financial Spreadsheet for New Program Proposals* (excel spreadsheet) is attached. There are 4 sections to the spreadsheet. Section I shows the amount being requested from the WIU Foundation account to which The Moline Foundation and John Deere Foundation gave with the specific intention that the money be used to support enrollment growth in the College of Business and Technology and the School of Engineering at the WIU-Quad Cities Campus.[17]

Sections II and III show how the money requested in Section I will be used. In Year 1, up to $2,475.04 will be used to provide scholarships to between 4 and 8 learning assistants to take the 1 s.h. "Science of Learning" course. This will show as revenue for WIU because the scholarships are paying for tuition and fees. Revenue will increase if additional students who are not learning assistants enroll in the course. Revenue will decrease, as will foundation account expenditures, if a learning assistant from one semester is retained in the role of learning assistant in a subsequent semester. Section III shows the expense for this pilot. The only expected expense is the salaries of the learning assistants. The number of learning assistants is 8 and is based on the positions available (4 courses with two learning assistants per course) rather than the number of actual students serving as learning assistants. The assumption here is that a learning assistant will serve

[17] On 2/10/17, this proposal was sent to the fiscal agents on the foundation account in question to be considered for funding.

in only 1 learning assistant position per semester but could potentially serve as a learning assistant over the course of 2 or more semesters. Four of the learning assistants will work 6 hours per week and 4 will work 8 hours per week for 15 weeks of the semester. The spreadsheet shows an average of 7 hour per week worked. The pay rate of $9.55 per hour is consistent with the student worker job category for tutors (category 4001). This level of compensation was chosen because learning assistants, with their pedagogical training and their previous success in lower level STEM courses fits the description of Level IV student workers. These are students with specialized skills or training, including tutors, who earn a wage over $9.50 per hour.

Section IV shows the net revenue (loss) for the first year of $(5,546.96). The current spreadsheet shows exactly the same situation for years 2 and 3. Expenses will remain steady over the 3 year pilot but revenue has the potential to increase. The increase would occur if students other than learning assistants enroll in the "Science of Learning" course. It will also increase if students in the four courses with learning assistants succeed at a higher rate or are retained at a higher rate. For example, if one additional student is successful in Phys 211 and is then able to immediately enroll in Phys 213 the following semester an additional 4 semesters credit hours would be produced leading to increased revenue of $1,237.52. When students do not succeed in one of these classes, but remain enrolled in the program they are typically advised to repeat the course at one of the local community colleges the following semester. Profitability and return on investment are difficult to calculate with retention. However, with an average attrition rate of 40% a simple calculation would show that if just 1 additional student was retain each year because of this program, profitability would be realized by the end of year 3.[18]

V. Larger WIU Goals

The goals for this pilot, slightly modified from the original goals as set by the UC-Boulder program, are detailed below.

Goal 1: Increased success for first-year engineering students. Because of the national and regional need, and the local investment, the growth and success of the engineering program along with the completion rate of the students in the program is important. However, as is the case in some other engineering programs across the country, WIU-QC engineering students have experienced a lower-than-desirable first-to-second year retention rate. The proposed outcome for this goal is to increase the first to second year retention rate of students who enter with an engineering major by at least 1 percentage point each year for three years.

Goal 2: Undergraduate Course transformation. The goal is to move these traditional lecture-based courses toward a higher impact active learning style, which has been demonstrated to be more effective in promoting student learning. This, accompanied by the learning assistants in the

[18] Retaining one additional student who takes a minimum of 12 credit hours per semester in each semester in year two would add an additional 24 credit hours of revenue per year for a total increased revenue of $7,425.12 in year two and $14,850.24 in year three.

classrooms will reduce the DFW (D's, F's, and W's)[19] ratio in these traditionally challenging courses first year STEM courses. An important sub-goal is that this approach seeks to help change the environment in a way that welcomes and encourages underrepresented populations to pursue and be successful in STEM careers, by creating a more collaborative learning environment and a greater sense that WIU is invested in their success. At Rochester Institute of Technology, where learning assistants were used in applied calculus, the DFW rate dropped from 27% to 19%. In their multivariable calculus course, the DFW rate dropped from 36% to 18%. The proposed outcomes for this goal are to lower the DFW rate by at least 8 percentage points from the 4 year average prior to the start of the pilot.

Goal 3: Transformation of departmental cultures. This proposal capitalizes on the small size and history of cross-college cooperation at the Quad Cities campus in support of one of the QC campus' signature programs – engineering. It provides an opportunity to incubate this proven approach to undergraduate education in a way that should demonstrate its utility and provide a template to the rest of the University for how the university might rethink its approach to undergraduate education.

Goal 4: Change the student culture at WIU-QC. WIU-QC is in a transition from a junior/senior/graduate level commuter campus to a regional comprehensive 4 year public institution that serves the Quad Cities region. Part of the challenge facing this campus is helping students identify with this campus in spite of the lack of the traditional accoutrements of a residential four-year campus. Employing undergraduates as learning assistants invites these students to invest in the educational enterprise of WIU-QC, and to identify personally with the quality and success of this institution. The learning assistants' increased connections with the students in the courses to which they are assigned is also expected to increase student connections. Measures of both student satisfaction and feelings of belonging will be taken from the WIU- Quad Cities Fall Student Survey. The proposed goal is an increase the percentage of students who say they feel connected somewhat, quite a bit or a tremendous amount.

Goal 5:

A. Provide greater success and enhanced learning opportunities for learning assistants. The highest achieving students are often looking for ways to enhance the quality of their education. While engaging in research and in projects is one way, another proven way to improve learning and enjoyment as a student is to engage in the process of teaching others and reflecting on the processes by which their students and they themselves learn. The University of Colorado Boulder saw an increase 6-year graduation rate among the learning assistants of 10 percentage point as compared to a control group. The proposed goal is to increase the graduation rate of high performing STEM students from the Quad Cities Campus by at least 5 percentage points.

[19] The phrase DFW rate is used here because it's common in the higher education literature and is understood to mean slightly different things at different institutions. For these courses at WIU we acknowledge that a student must get a C in order to move on to the next course in the sequence. Thus C- and lower are all included when we use the phrase DFW.

B. Provide enhanced classroom experience for instructors. As the undergraduate courses with learning assistants change to active learning style, and more students grasp the key concepts of these challenging subjects, the expectation is that instructors will spend less time with remediation and more time exploring the challenging topics within the subject.

Goal 6: This is a long term goal which will not be measured in the pilot because a secondary teacher education program does not currently exist on the Quad Cities Campus. If the pilot is successful, the goal will be to recruit high performing STEM undergraduates into teacher education. This will be measured by the increase in the number of STEM students completing a teacher education program.

All of these current goals correspond with WIU's Values in the Higher Values in Higher Education Strategic Plan. Goals 1-4 speak to WIU's commitment to Academic Excellence, Educational Opportunity, Personal Growth, and Social Responsibility. In addition, if in the future the High School teacher licensure program is introduced up at the Quad Cities campus, recruitment into the teacher education program would be added to the above goals.

The goals and this proposal specifically are scalable to both campuses and to a wide variety of programs. Should the pilot be shown to be successful, the nest steps should see the Learning Assistants Model expand to Math 137 on the Quad Cities Campus and Math 133 and 134 and Phys 211 and 213 on the Macomb campus. After a successful test with these courses, plans can then be made to scale the model other courses on both campuses.

VI. Outcomes and Assessment

The purpose of assessing this program will be to demonstrate effectiveness. The matrix attached to this proposal contains the program goals, the desired outcomes, the proposed outcomes, which are the minimum results required for the pilot to be considered successful, and an actual results column to be completed at the end of each semester.

Full Implementation or Sunset plan: should the actual outcomes consistently fall short of the proposed outcomes, the Learning Assistants pilot will end at the end of year three. A determination will be made by the end of the fall semester of year three whether the actual outcomes are consistently lower than expected. Consistent is defined here as more than 50% of the time. In practice, this will mean that the proposed outcomes will need to be met in at least 3 of the first 5 semesters to consider this program a success. If the university chooses to continue after a successful pilot, a new assessment plan to demonstrate effectiveness will be made prior to the start of year 4.

If the university decides to fully implement the Learning Assistants Program, ownership of the program will need to be decided. Of the 91 colleges and universities that had a Learning Assistants Program, 61 of them were funded at the department level. An additional 26 were

funded through a National Science Foundation Grant. Additionally, the data from Learning Assistants Program Overview created by the University of Colorado Boulder shows that Learning Assistants Programs have been implemented in 211 departments in the 91 institutions. The fact that they chose to disaggregate the data based on departments and that the majority are funded by departments or grants suggests that ownership of the Learning Assistants Programs is located at the department or college level rather than the university level.

VII. Conclusion

To conclude, the Learning Assistants model, which was implemented at the University of Colorado Boulder in 2003 has been shown to increase the retention and completion rates in courses in which the model is used. Lower-level STEM courses tend to be barriers for entry into STEM majors for multiple reasons, including lack of self-efficacy on the part of certain students, to gaps in time between math and science course work for transfer or non-traditional students, to differences between the student and faculty understanding and expectations. Including learning assistants in the classroom helps to mitigate barriers many students face and as a result, increase retention.