



UW System FY16 Innovation Program Final Project Report:

- Due: Monday, February 15, 2016
- Email completed report to David Stack, Interim Associate Vice President & CIO, UW System: dstack@uwsa.edu (cc: dtrendt@uwsa.edu)
- Please Note: All reports will be posted on the Innovation Program Project Reports web page.

Innovation Program Project Report 1 – Amundson, Fritz, & Adam UW-Marshfield/Wood County

BACKGROUND

The Final Project Report summarizes the work of the team and its results. It communicates any problems the team was faced with while working on the project, the customers or communities it influences, and the solution proposed or delivered by the project. **Notably, this report is based on an incomplete project. A subsequent report will follow at the end of the current semester that represents the completed work.**

REPORT CONTENT

1. Executive Summary
2. Purpose and Objectives
3. Organization and Approach
4. Analysis and Findings
5. Conclusions and Recommendations
6. Appendix

1. Executive Summary

The main points of the report are concentrated on the impact of the delayed grant notification and subsequent delays that occurred. First, the report discusses the delay's impact on addressing the problem of creating a personalized learning experience. Specifically, it mentions how students only recently began utilizing the technology to create a more hands-on learning experience based on their interests. Second, it addresses how the delays have influenced research activities. That is, how our ability to complete task related assessments has been impeded. Third, the report discusses any relevant impacts on analysis and findings. Finally, we comment on the limited conclusions and recommendations for future action that can be made as a result of the delays.

2. Purpose and Objectives

The project was designed to address the problem of creating a personalized learning experience in science, technology, engineering, and mathematics coursework (i.e., STEM coursework). This problem is being investigated by Dr. Jeff Fritz, Dr. Iddi Adam, and Dr. Jeff Amundson on the campus of UW-Marshfield/Wood County. Specifically, this initiative originally proposed involving students taking courses in the STEM fields of physiology (BIO 286 Physiology and Anatomy, fall 2015) and biopsychology (as part of PSY 202 Introductory Psychology, fall 2015).

Often student classroom and laboratory sessions suffer from student inactivity because each is largely a passive, instructor driven exercise and divorced from the process of discovery (Miller & Metz, 2014). Miller and Metz (2014) surveyed students in physiology courses and found that students thought active learning projects should occupy 40% of face-to-face class time. In past physiology and anatomy courses at UW-Marshfield/Wood County students were limited in their ability to actively engage the topic because the equipment being used was antiquated. Specifically, it lacked protocols, references, a user friendly nature, accuracy and ability to communicate with other formats, and did not allow the student the option to use the software on their personal laptop. The psychology students did not have any technology for engaging the content of the course actively other than virtual non-interactive or limited interaction demonstrations which lack



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the tangible hands-on experience. Active learning initiatives are transforming the educational experience from the traditional lecture model. Indeed, research clearly demonstrates the effectiveness of active learning in STEM coursework (for reviews see Freeman et. al., 2014; Zayapragassarazan & Santosh, 2012). Physiology and biopsychology are about allowing the students to get their “hands dirty”. The iWorx Kits provide the “hands-on” experience to balance out the theoretical and practical content. Plus, because it is open-ended, the students have recently started to design their own experiments and bring their hypotheses to life.

Due to several delays our objective of creating a more personalized learning experience for psychology students could not be achieved in the fall 2015 semester and 2016 spring semester. These delays were the delay in awarding the funding (three weeks from the original date of September 7th), the time to acquire, process the purchase order, and receive the equipment (ten days), and in acquiring the laptops (requirements from central for purchasing and imaging of the laptops delayed the program another three weeks). The project was designed to be part of a semester long course in which repeated student use of the equipment was used for instruction and assessment starting the week of September 6th. Thus, by the time the equipment was available the semester was 3/5 over. Then during the spring 2016 semester Dr. Amundson was not assigned an introductory psychology class on campus. While the inability to initiate the project also prevented fall 2015 physiology and anatomy students from using the technology in class, this has not been the case for the spring 2016 semester.

Students in Dr. Fritz’s physiology and anatomy class began using the equipment in early February. Activities in the class are centering on data-intensive questions to enhance inquiry based learning and development of problem solving skills applicable across academic disciplines. In an effort to improve student curiosity and promote a personalized approach to learning Dr. Fritz is using multiple iWorx modules with on-line support software. These modules offer students the opportunity to explore a wide variety of physiologically relevant topics that promote personalized learning through open-ended, inquiry-based interactive projects. Students can record a variety of physiological laboratories (e.g., skin, muscle, central nervous system physiology). Importantly, students are using the data sets to create various types of experimental protocols using the iWorx software (e.g., developing an experiment to test a variable related to muscle physiology). Specifically, Dr. Fritz is using a laboratory assignments designed with two sections. In the first section students are given a problem to solve using a tutorial followed by a section that requires students to formulate their own experiment.

3. Organization and Approach

Dr. Amundson is meeting with Dr. Fritz and Dr. Adam to discuss implementation and equipment issues (i.e., successes and failures) on a monthly basis. The team discusses data from instructor’s journals, Dr. Adam’s observations, graded student work and exams, and student surveys.

We are using instructor journal entries and Dr. Adam’s observation data as a means of quality control. We decided instructor journals allow us to make note of success and failures immediately and Dr. Adams’ observations allow students an additional way to provide input for the development of the personalized learning environment. The use of graded work and exams as it correlates with project outcomes is meant to show increased test performance and reduced student failure. The delays prevented assessment from being completed. We did conduct two meetings for the purpose of rescheduling of assessment deadlines and activities. Additionally, we had originally proposed student journals but decided the time expense for both student and instructor was not worth the benefit of the data. The use of surveys to collect student and faculty data was used for several reasons.



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The delays did allow us to get better prepared for the start of the project. We collected the baseline data in early February. The survey questions for students are organized into four categories. The categories are Demographics, Engaged Learning, Active Learning, Equipment Usage in the Learning Environment, and Undergraduate Research. These were questions from previously published work. The rationale for this decision was the published questions were more valid than formulating our own and it will allow us to compare our results to previously published work. If we see similar results, it validates our approach. Moreover, using published questions will help facilitate publication of our own results. At the end of the semester Dr. Amundson will administer a team survey addressing faculty issues related to implementation of active learning projects and use of iWorx equipment; and change in attitudes towards and continued use of iWorx as an active learning tool. The rationale for collecting this information is to round out the assessment with faculty input so as to determine if faculty experiences are a variable in the success of the project. That is, if faculty has a bad experience, it could correlate with students not finding the personalized learning experience effective.

Due to changes in IT from regionalization we were unable to create a monitoring log for when each student accessed the lab manual on D2L.

4. Analysis and Findings

As mentioned above in the Organization and Approach section the survey questions are divided into questions about demographics, engaged learning, active learning, equipment usage in the learning environment, and undergraduate research. Again, because we are just starting, we only have baseline data (i.e., the first survey prior to the first use of the iWorx system). Thus, some categories of questions provide little information. For example, the items related to active learning are based on student interpretation of the instructor expectations and behaviors as the class progresses (e.g., my instructor provided opportunities for observing or practicing scientific or clinical skills). This is the first time students have Dr. Fritz as an instructor and are just in the beginning of the course, thus, the ratings are meaningless. However, we did discover students in general scored the Active Learning section higher than expected. This could be a result of students misinterpreting the questions as what the instructor *might* expect or do; or students based their judgement on experience with other instructors. The questions related to the use of the equipment in the learning environment are irrelevant at this time because the equipment was not used prior to the survey. However, the categories of Engaged Learning and Undergraduate Research do provide some information.

In general, students rated their level of engagement with learning and attitude toward undergraduate research at approximately a 3.5 on a 5 point scale. We will have our second measure on March 17th after students use the iWorx equipment for a second time and our third assessment will be on May 5th. We expect to see increased ratings for questions in the categories of Engaged Learning (e.g., student's report higher rating for items related to being focused in class and thinking about class content) Equipment Usage in the Learning Environment (e.g., student's report higher comfort levels with using computer-based laboratory equipment and drawing conclusions from a physiological or psychological study), and Undergraduate Research (e.g., student's give higher ratings for undergraduate students being qualified to do research). Additionally, Dr. Iddi Adam will collect his observation data on April 7th. Specifically, Dr. Adam will observe the students using the equipment and have a brief focus group with the students to assess their thoughts on the usefulness of the technology in promoting personalized learning.

There are no anticipated risks to the project as we move forward.



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5. Conclusions and Recommendations

The project has just begun and thus, we are not able to provide any conclusions. However, because of the nature of our project we can provide some recommendations. Our plans are to expand this project into a line of undergraduate research projects with the goal to have students present at regional conferences and eventually publish their data. In fact, a student is currently using the equipment as part of an undergraduate research project. As this program of undergraduate research grows we plan to use this program as a launch point for a larger STEM project. This larger project will help recruit local middle school and high school youth to the UW-Marshfield/Wood County campus and potentially regionally as well.

If additional funding was available we would primarily need funding for additional equipment and supplies. The additional equipment would allow us to conduct additional psychological and physiological laboratories and experiments. For example, the purchase of a response pad for recording multiple choice responses would allow students to conduct behavioral marketing research to investigate the relationship between the human mind (psychology) and the physiological responses to what is being demonstrated. Notably, this could potentially serve as a recruiting tool for students interested in business. The supplies we need would be additional EEG gel and EEG electrode adhesive pads.

One of the reasons we purchased the iWorx equipment is because it is easily shared. Specifically, the equipment is portable and as new faculty and instructors are hired they will be able to use the prepackaged laboratories for their courses and research. We can already connect with other UW schools because they have the same equipment. Specifically, there are iWorx units at UW-Eau Claire, UW-Green Bay, UW-Rock County, UW-Parkside, UW-Manitowoc County, UW-Oshkosh, UW-Platteville, UW-Waukesha, UW-Washington County, and UW-Whitewater. Our students can record their data then share it with other students who can download the iWorx software and manipulate the shared data. This could create interesting student collaborations across campuses.

6. Appendices: Team Members, Student Survey, Budget, Presentation Questions

Team Members:

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Student Survey Tool

PLEASE READ TO STUDENTS PRIOR TO ADMINISTERING ASSESSMENT

Thank you for participating in this assessment of personalized learning. Personalized learning is defined as adjusting the pace (individualization), adjusting the approach (differentiation), and connecting to the learner's interests and experiences ([US Department of Education](#), 2010). The purpose of this assessment is to determine how various factors in the college environment (engagement, active learning, and undergraduate research opportunity variables) promote personalized learning. Please do not put your name on any of this documentation. There will be no personal information attached to this data. **Importantly, your participation or non-participation in this assessment will not have a negative impact on your grade in this course.** All your responses will only be used to develop the class for current and future students. This development process may involve presentation of the data to meet reporting requirements for funding from UW-System grants. The data may also be presented at a professional conference on teaching and/or published in a journal devoted to the scholarship of teaching. You will be provided a report regarding the outcome of the assessment if you choose. If you want a report please send an email to your professor requesting one. You can also contact the primary investigator/project coordinator, Dr. Jeffrey C. Amundson at 715.389.6528 or by email at Jeffrey.amundson@uwc.edu. At any time, you may discontinue your participation in this assessment. Your completion of the survey indicates your consent for this data to be publically reported. Please keep this top sheet for your records.



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Demographic Variables

Gender: ___ female ___ male

Age: _____

Is English your first language?

___Yes

___No

Race/ethnicity

___ African-American/Black

___ American Indian/Alaskan Native

___ Asian-American/Asian/Native Hawaiian/Pacific Islander

___ Caucasian/White

___ Latino

___ Multiracial

___ International Student

___ Prefer not to respond

___ Other (specify: _____)

How would you describe your grades in college?

___ mostly A's

___ mostly A's and B's

___ mostly B's

___ mostly B's and C's

___ mostly C's

___ below a C average

Engaged Learning

Strongly Disagree Strongly Agree

1	I often discuss with my friends what I am learning in class.	1	2	3	4	5	6
2	I regularly participate in class discussion.	1	2	3	4	5	6
3	In the past week, I've been bored in class a lot of the time.	1	2	3	4	5	6
4	I feel as though what I am learning in this class is worthwhile to me in my future health profession or life.	1	2	3	4	5	6
5	It's hard for me to pay attention in this class.	1	2	3	4	5	6



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6	I can usually find ways of applying what I'm learning in class to some aspect of my future profession or life.	1	2	3	4	5	6
7	I feel energized by the ideas I am learning in this class.	1	2	3	4	5	6
8	I ask my professor questions during class if I do not understand.	1	2	3	4	5	6
9	Often I find my mind wandering during class.	1	2	3	4	5	6
10	At least once in the last month, I have gotten so involved in what I was doing for a class that I lost track of time.	1	2	3	4	5	6
11	I am learning a lot in this class this semester.	1	2	3	4	5	6
12	It's hard to pay attention in this class.	1	2	3	4	5	6
13	I find ways to make course material relevant to my life.	1	2	3	4	5	6
14	I find myself thinking about what I'm learning in class even when I'm not in class.	1	2	3	4	5	6
15	Sometimes I am afraid to participate in class.	1	2	3	4	5	6
16	I enjoy talking to my professors about what I'm learning in class.	1	2	3	4	5	6
17	I usually think about how the topics being discussed in class might be connected to things I have learned in previous class periods.	1	2	3	4	5	6
18	When I am learning about a new idea in a class, I think about how I might apply it in practical ways.	1	2	3	4	5	6
19	Sometimes I get so interested in something I'm studying in class that I spend extra time trying to learn more about it.	1	2	3	4	5	6
20	When an idea is being discussed during class, I think about my own opinion on the matter.	1	2	3	4	5	6

Active Learning

Almost Never **Almost Always**

10	My instructor provided opportunities for observing or practicing complex scientific or clinical skills	1	2	3	4	5	6
11	My instructor guided students in debriefing activities that enabled students to evaluate and judge the quality of their thinking.	1	2	3	4	5	6
12	My instructor demonstrated good thinking out loud.	1	2	3	4	5	6



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13	My instructor expected students to acknowledge and improve areas of weakness in skills and knowledge.	1	2	3	4	5	6
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Almost Never **Almost Always**

14	My instructor expected students to read textbooks or journals before class/small groups.	1	2	3	4	5	6
15	My instructor used technology or web-based activities to promote complex thinking (e.g., Discussion boards, role-playing games).	1	2	3	4	5	6
16	My instructor used small groups to promote problem-solving.	1	2	3	4	5	6
17	My instructor expected students to search for and find relevant information to answer questions or solve problems.	1	2	3	4	5	6
18	My instructor expected students to think about how information or concepts are connected to each other.	1	2	3	4	5	6
19	My instructor promoted students to integrate learning from several courses to make class information more meaningful.	1	2	3	4	5	6
20	My instructor used interactive methods while lecturing to stimulate discussion about information and concepts.	1	2	3	4	5	6
21	My instructor used activities to promote the connection of information to students' prior knowledge.	1	2	3	4	5	6

iWorx Equipment Usage in Learning Environment

On a scale of 1 (very low) to 5 (very high) please rate your comfort level, knowledge or experience level, and interest level for the following items. Please put a number from 1 – 5 on the line for each comfort level, knowledge or experience level, and interest level.

1.) Applying the scientific method to physiological or psychological issues.

Comfort level _____
 Knowledge or experience _____
 Interest _____



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2.) Learning to apply course material to improve problem solving and decision making.

Comfort level _____
Knowledge or experience _____
Interest _____

3.) Developing specific skills, competencies and points of view needed by professionals in the field of psychology or physiology most closely related to this course.

Comfort level _____
Knowledge or experience _____
Interest _____

4.) Gaining factual knowledge of Anatomy and Physiology or psychology (terminology, classifications, trends).

Comfort level _____
Knowledge or experience _____
Interest _____

5.) Learning fundamental principles, generalization, or theories of Anatomy and Physiology or psychology.

Comfort level _____
Knowledge or experience _____
Interest _____

6.) Using computer-based laboratory equipment (iWorx).

Comfort level _____
Knowledge or experience _____
Interest _____

7.) Knowledge of scientific methodologies.

Comfort level _____
Knowledge or experience _____
Interest _____



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8.) Drawing conclusions from a physiological or psychological study.

Comfort level _____
Knowledge or experience _____
Interest _____

9.) Knowledge of physiology or psychology as a scientific discipline.

Comfort level _____
Knowledge or experience _____
Interest _____

10.) Knowledge of clinical applications (e.g., understanding the use of EKG or EEG for assessing client status).

Comfort level _____
Knowledge or experience _____
Interest _____

11.) Do you have any comments you would like to share about iWorx? **If you have not used iWorx, please skip this question.**



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Undergraduate Research

Very Unlikely Very Likely

1.)	If you had the opportunity to participate in undergraduate research, how likely would you be to participate?	1	2	3	4	5
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2.) Why would you want to conduct undergraduate research? Please put a check mark next to your choice. Please pick one.

- It is necessary for you major or possible major _____
 You are interested in finding out more about a field of study. _____
 Monetary benefits _____
 I am using it to benefit my career _____
 Other (please state another reason) _____

3.) Have you been informed about undergraduate research opportunities (Please put a check next to your choice)?

Yes _____
 No _____

Strongly Disagree Strongly Agree

4.)	I believe that students who are involved in undergraduate research are more engaged in school.	1	2	3	4	5
5.)	I believe undergraduate students are qualified to do research.	1	2	3	4	5
6.)	I believe undergraduate students who participate in undergraduate research will benefit overall.	1	2	3	4	5
7.)	I think undergraduate research is relevant to my field of study.	1	2	3	4	5
8.)	I am too busy with other activities (school, work, sports teams, other extracurricular) to participate in undergraduate research.	1	2	3	4	5
9.)	There are ample undergraduate research opportunities in my major or potential major.	1	2	3	4	5
10.)	If there were more undergraduate research opportunities in my major or my potential major I would participate in undergraduate research.	1	2	3	4	5



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Proposed Budget

	Item Description <i>(person or item)</i>	“Hours and Rate” (if labor) or “Purchase Cost”(if non-labor)	Line Total
1	4 iWorx Platforms n(includes software & hardware)	\$13,840	\$13,840
2	4 devoted laptops	\$4,000	\$4,000
3	Labor: 1 person @ \$20/hr for 100 hrs	\$2,000	\$2,000
4	Miscellaneous (e.g., extra wiring)	\$160	\$160
5			\$
6			\$
7	(add lines as necessary)		\$
		Total Request:	\$20,000
1	Matching Funds (Source: _____)		\$
	(add lines as necessary)		\$
		Total Matching funds:	\$

Final Budget

	Item Description <i>(person or item)</i>	“Hours and Rate” (if labor) or “Purchase Cost”(if non-labor)	Line Total
1	4 iWorx Platforms n(includes software & hardware)	\$13,840	\$13,840
2	4 devoted laptops	\$4,000	\$4,000
3	Labor: 1 person @ \$20/hr for 100 hrs (* see below)	\$595	\$595
4	Miscellaneous (shipping)	\$160	\$160
5			
6			\$
7	(add lines as necessary)	Total from Below:	\$1,405
		Total Request:	\$20,000
1	Matching Funds (Source: _____)		\$
	(add lines as necessary)		\$
		Total Matching funds:	\$

*Due to the fact that the project just began and it is a semester long project several additional labor expenses will be incurred as the semester progresses. This includes the following projected expense:



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Coordination and Management of Monthly Meetings: 3 @ .5 hr each = \$30

Administration of Surveys: 3 @ .25 hrs each = \$15

Team Survey Development, Administration, and Analysis: 2 hrs = \$40

Demonstration of Equipment to Other Faculty: 2 hr = \$40

Correlation of Graded Work and Exams with Project Outcomes: 20 hrs = \$400

Student Survey Data Coding, Entry, and Analysis: 40 hrs = \$800

Updated Final Report: 4 hrs = \$80

TOTAL = \$1,405

FINAL PRESENTATION – QUESTIONS:

Would you and/or your team be interested in organizing a 5-minute presentation describing your project at the Spring 2016 ITMC Conference scheduled for April 18-19 in Wisconsin Dells?

- Yes, I/our team will give an in-person, 5-minute presentation at the Spring ITMC Conference in April.
- Yes, I/our team will give a virtual, 5-minute presentation at the Spring ITMC Conference in April.
- Yes, I/we approve of having our ITMC presentation recorded for posting on the website.
- No, I/our team declines the opportunity to give a 5-minute presentation at the Spring ITMC Conference.