

**Division of Academic Affairs
Technology Fee – Systemic Project Proposal 2015**

Project Title

A Data Analytics Lab Promoting Job Readiness and Skill-Building beyond STEM through Hands-On Active Learning Experiences

Total Amount of Funding Requested

\$280,000.00

Primary Project Coordinator

Dr. Michelle Hale Williams, Professor of Political Science and Chair, Department of Government

with support from Information Technology Services, led by Mr. Michael Dieckmann, Chief Information Officer

Unit Head Acknowledgment

Unit Head Signature: 

Date: 1/21/15

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Systemic Project Proposal Template
2015

1) Description of Initiative/Investment to Enhance Instructional Technology

Data analytics is a growing and important skillset in today's job marketplace. With data more available than ever before to businesses, governments, and non-profit organizations, the demand for people equipped to analyze, interpret, and describe data has never been higher. Still, training students at UWF in data analytics has lagged behind in part due to facilities. This proposal creates a data analytics lab at UWF. The Department of Government would pilot the launch of the data analytics lab in partnership with ITS, experimenting with innovative, collaborative styles of technology enhanced active learning in pods or learning communities in the classroom. As the lab develops, its use would broaden to the wider UWF community to train students in data analytics across disciplines.

The Department of Government makes sense as a host to pilot the data analytics lab at UWF. In political science published work over the past decade has become increasingly quantitative utilizing advanced statistics and econometrics to perform analysis. The availability of data and the reliance upon datasets for analysis in our discipline has never been greater. Students in political science need the skills of hands on interpretation and analysis of data to master both the undergraduate and graduate level skills of our discipline. Political science literacy requires the ability to interpret data analysis output in order to read most published work in political science. Political science today requires students to be able to manipulate data and generate data analytics displays. For our students to be competitive with training obtained at most other universities where the data lab experience is common as part of the curriculum, UWF political science students need time working with data in a lab setting.

Current model:

Undergraduate students at UWF outside of the STEM disciplines and the College of Science, Engineering and Health (CoSEH) do not have access to data lab experiences despite being in programs with required research methods courses. In majors within the Department of Government where research methods is a required course, including Political Science, International Studies and Pre-law, we searched for shared space only to find that departmental data lab spaces, such as that in Psychology were fully utilized by their own students. We asked classroom space scheduling officials to help us identify computer lab or computer cluster classrooms only to find either there were not enough computers for our students in research methods (we needed 40 to 45) or those spaces were not available. We ended up booking the library classroom space, where there are 30 computers available.

Limitations of Current Model:

Three primary limitations manifest in our present model including lack of: available computer classroom space, ample supply of computers (one per student needed), and software / datasets. Each challenge is discussed briefly here.

- (1) Instructors have limited access to space for in-class, synchronous, data analysis work with students when the library classroom space is available. Competition for that space has been high as the space is intended for general library instruction and a wide variety of other multi-purpose activities. Often our instructors have only been able to get into that space two to five class meeting times per semester as the schedule and demand during class times permits. The library classroom reservation policy does not allow a single class to claim that space recurrently during class meeting times over the course of a semester to ensure that it is more widely available.
- (2) Physical space presents a problem in the library classroom for our classes as seating and computers are limited to 30. With so few computers available in a class with enrollment of 40 to 45, the rest of our students had to either borrow a library laptop or bring their own to class and sit on the floor to use it during class meetings in the library classroom for data analysis work.
- (3) Only standard software, typically Microsoft Office products, can be found in the library classroom. When using Excel for data analysis in that classroom, instructors have had to take class time to have the students add the Data Analysis ToolPak Add-In for work with statistical analysis in class, and the ToolPak disappears with each logout. While e-desktop would be a possibility for using some data analysis software packages, the time to sit students down, log-in to access e-desktop and get started does not lend itself well to 50 minute or even 75 minutes class meeting sessions. Then students have to access dataset files and download them to the library computers for each use. This can also be time consuming and having the data already loaded would be of great benefit in saving time.

In sum, having enough dedicated computers for each student to perform data analysis with a variety of software, datasets and add-ins already configured would be of tremendous value in getting right to work with students during limited, often 50 minutes class sessions.

New Model: Add a Data Analytics Lab to Address these Challenges

Three primary limitations of the present model were discussed above: available computer classroom space, ample supply of computers- one per student, and software / dataset availability. Potential solutions to each challenge through a campus data analytics lab are discussed briefly here.

- (1) A dedicated, available classroom space for the purpose of data analytics has many benefits. Students could advance in their skills much farther in research methods in the current class offered once each semester. The department could add other courses in visual data analytics, qualitative analysis such as content analysis, and additional

techniques in quantitative data analysis beyond what we can presently accomplish if space were available more readily.

- (2) This proposal is asking for 48 seats with computers to accommodate methods course enrollment. Additionally, the larger space in the ITS building can accommodate more seating, pods for group work where the library classroom is organized in rows with tall monitors not readily amenable to active learning and group collaboration. The larger space would be configured for group work, with active learning and dialogue building critical thinking and analysis skills in improved ways.
- (3) Pre-configured workstations with data analytics software and pre-organized datasets affords the advantage of getting into the classroom and getting right to work on analysis. The start-up time and difficulties encountered in the library classroom are overcome by having the data analytics lab pre-configured with software and hardware for the purpose of analyzing data. This proposal plans for and requests software and tools to enable instructors to introduce students to other packages for data analysis, ranging from those for visual data analytics (such as Tableau) to SPSS which is widely used in Political Science, and also to qualitative content analysis software and textual analysis software. We would also be able to add more data analysis classes to our curriculum to have students use more of these tools for data analysis.

How the new model would work:

This project would provide a data analytics lab space in the Building 79 SAIL lab where students could manipulate and analyze data synchronously with their instructor. Rather than rows of seating, students would be arranged in pods to facilitate collaborative, active learning communities. They would be able to work on data analytics assignments with their own computers, yet an individual in a group would be able to show one way of doing things to the group on the group monitor. The instructor would also be able to take one group's best idea and share it with the class by projecting it on all monitors in the class simultaneously. This would allow for both collaboration and also best practices to evolve in the process of data analysis.

2) College/Unit-wide or University-wide Scope

A data analytics lab space is needed campus-wide and especially across CASSH, COB and COEPS. The initial proposal presented here focuses on piloting the data analytics lab with the Department of Government and its majors in Political Science, Pre-law, and International Studies. However, the longer-term vision is for this lab to expand to meet the needs of other disciplines that perform data analytics throughout the social sciences, business majors, education majors and beyond.

At UWF, students in the social sciences and business disciplines, as well as many in professional studies disciplines, work with statistics and data in their curricula. Many of these have research methods courses, yet these are typically taught in traditional classrooms, with only the instructor manipulating data. Student learning occurs through

instructor examples in class with assignments completed by students as homework. One of the problems with this approach, where the active learning activity occurs without the instructor present, is that when students struggle, either with learning to use the software for analysis or with questions when the data analysis fails to run to deliver the appropriate answer(s), ready help and guidance is not available.

Collaboration with Information Technology Services (ITS):

ITS is a supporting partner in this proposal. ITS proposes to re-configure the SAIL student computer lab in Building 79 to serve as a University Data Analytics Laboratory (DAL), with the Department of Government as the charter client of the DAL. While SAIL was once the primary student computer lab for UWF, usage has steadily declined over the past several years as other computer laboratories and, in particular, computer availability in the John C. Pace Library has grown. Student use of SAIL is presently minimal, and ITS has been considering new uses for this computer lab space. Re-creating SAIL as a Data Analytics Laboratory, available to all colleges and academic programs, aligns well with the need identified by the Department of Government.

The SAIL laboratory is currently configured with 36 computers arranged in work pods of 3-4 each, with ample space for additional pods. SAIL also has an adjoining workroom that can serve as office and work area for instructors and teaching/lab assistants working there.



To re-equip SAIL as a Data Analytics Laboratory supporting active learning methodologies, ITS would make the following alterations to the space:

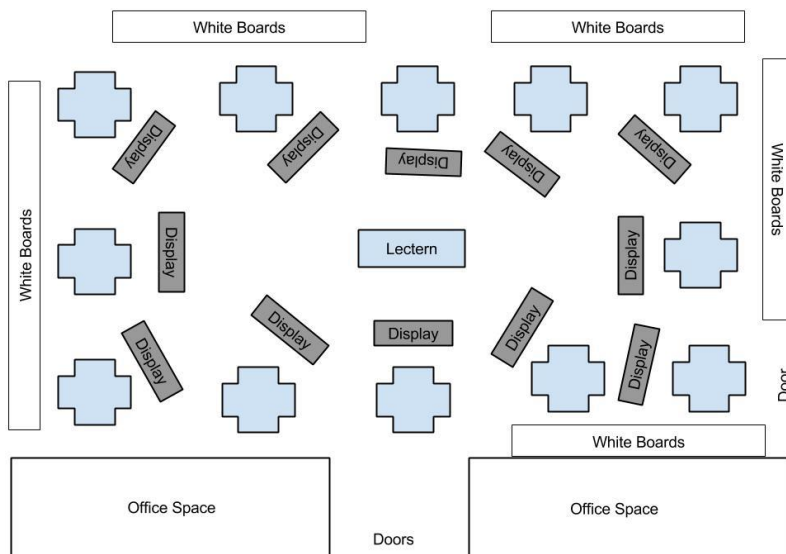
- Increase the number of computer workstations to 48 (arranged in twelve pods of four each).
- Provide an instructor teaching podium equipped with standard eClassroom technology.
- Using the Crestron Airmidia system, provide each student computer work pod with its own large-screen display that can be utilized by computers in the pod to share work. In addition, under the instructor’s control, the instructor can project to all Airmidia displays, or can route a particular student or group’s display to all other displays. This provides a flexible and adaptable system for supporting individual or group student work in the teaching space, as well as facilitating instructor-led teaching. See https://www.youtube.com/watch?v=IfT_hoiuY8w-t=41 for one example of other universities’ use of the Airmidia technology.
- Provide 10 laptop computers for student use in the Active Learning Classroom (Building 79, Room 174), which is adjacent to the Data Analytics Laboratory.

This will allow the Classroom to be used as a corollary active learning teaching space, particularly suited to support smaller graduate-level classes.

The image below shows a similar Active Learning lab/classroom design from the University of Singapore. While this does not exactly mirror the concept for the DAL, it shows the general principles of student work pods with shared group displays that can also be used by the instructor.



The layout sketch below shows a similar concept for converting SAIL to the Data Analytics Laboratory. Final layout design will be performed in collaboration with the instructional technology vendor and Department of Government faculty.



ITS will support the technology in the Data Analytics Laboratory. ITS will make both spaces (the Laboratory and the Classroom) available for course scheduling, with the Department of Government being the charter user of these spaces. This collaboration with Government will provide a “shake down” environment for working out technology issues and improving the Laboratory and Classroom based on instructor and student feedback, which will benefit other departments who wish to utilize these facilities.

During defined hours, when not scheduled for courses, the Laboratory will be available as an open lab for student use.

In addition, ITS will explore the feasibility of providing an eDesktop version of the Data Analytics Laboratory, to make similar capabilities available to online and distance learners and allowing courses utilizing the lab to be taught in blended face-to-face and online modes.

3) Project Alignment with UWF Strategic Plan

The UWF Strategic Plan (2012-2017) has as its first priority 1.1 the strategic direction of the advancement of student access, progression, learning and development. This emphasizes skill building to cultivate student job readiness and professional development.

Data analytics skills are a key component of workforce readiness in the twenty-first century. Wherever our UWF students go from here, data analytics skills can provide a game changing enhancement to their skills and knowledge toolkit. Private sector firms, public sector organizations, retail business both large and small, government at all levels, international organizations, political parties and interest groups all have data at their disposal today like never before. Still there is a need for people training in utilizing this data. Knowing where to begin, how to perform initial visual data analytics of large amounts of data, which software and techniques to use, how to interpret the output, and critically how to write about and make recommendations based upon the data output are vital skills of the twenty-first century that can potentially enhance the workplace readiness and job prospects of UWF graduates.

4) Benefits Provided

- bring data analytics skill-building to UWF

UWF would become a flagship institution hosting a data analytics lab for student learning. Undergraduate education has not kept pace with the demand for data analytics skills in both the private and public sectors. Traditional data labs are geared toward quantitative methods only, excluding qualitative methods and visual data analytics where the objectives are often to provide snapshot overview evaluations of data, graphing data, and using data to make a case for action or to draw a preliminary conclusion.

- improved student access to analysis technology

Student access is a major problem described above in item 1.1 under the current model description above. The inability to get time with computers in-class for data analysis has proven challenging. This plan provides the space and

appropriate number of computers, without the scheduling challenges of the library classroom which is shared space used for a wide variety of purposes.

- active and technology driven collaborative learning experiences

The learning experience of watching an instructor perform analysis of data versus performing the analysis simultaneously with the instructor is not comparable. The model presented here allows for active learning and interaction through the analysis process. Whereas having students do homework based on what they saw done in a computer-less classroom leads to complications where results are not achieved, confusion in the interpretation of results, and fails to yield the benefit of collaborative interaction through the data analysis.

- immediate but also sustained, expansive, longer-term student impact

Immediate impact through the pilot program begins with Department of Government students with majors in Political Science, Pre-law and International Studies in required research methods classes. This department has averaged 244 majors in recent years.

Major Enrollment	SP2012	SP2013	F2013	SP2014	SP2015	Average
International Studies	112	128	156	169	123	138
Political Science	58	53	59	59	42	54
Pre-Law	43	48	56	53	63	53
	213	229	271	281	228	244

Annually, the immediate impact is 80 to 100 undergraduates and 10-15 master's level students taking required research methods courses each year. The department anticipates adding another research methods class for a two course sequence if this grant is awarded to provide a data analytics lab. The additional course would provide a two-step sequence separating the initial visual data analytics step from the more intensive quantitative analysis step. Additionally, training would be provided for all departmental faculty to utilize the technology in the data analytics lab, encouraging its use beyond research methods courses to aid in interpretation of results from data analysis or to perform visual data analytics. This would further expand the immediate impact.

- accommodation of diverse learning styles

Active learning and collaborative learning provides flexibility for a variety of approaches to an assignment that can help students with diverse learning styles and abilities. The data analytics lab model presented here targets visual, hands on learners. The multiple monitors and hands-on approach allows a new style of classroom learning beyond lecture and the instructor driven approach where students watch as the instructor analyzes data on the front screen.

- enhance student / faculty skill training and facilitate collaborative research

This proposal would produce a data analytics lab where students and faculty will be able to jointly enhance their existing computer-aided analysis skills while exploring data. Faculty in the Department of Government utilize both qualitative and quantitative data analysis in the hypothesis-testing that is inherent in the social sciences. Common datasets include Census data, public opinion data, election data, economic development data, political stability data, and data on war and conflict occurrence. Yet, faculty have been limited in their research and in their teaching by software licenses, dataset availability (especially formatted and organized rather than raw datasets), and knowledgeable student assistants. Collaboration in the data analytics lab will likely yield more collaboration on research projects between faculty and students.

5) Measuring Success / Impact

Success will be measured through student evaluation of instruction and also internship and job placement rates. We currently have an exit survey in the department with completion required by all majors, we can add a question to that survey inquiring about the experience in these courses beginning with fall 2015. Additionally, the department can collect data there about job / internship placement and future plans including employment or employment prospects. Data suggesting that more of our student intend to go in the direction of data analytics in their future employment would suggest measured success, as presently our students often shy away from data analytics paths and generally lack confidence in their data analysis skills. They do not see themselves as having strong competency in math generally speaking. Yet our discipline relies upon students using the tools of math to analyze problems and suggest policy solutions or courses of action. They need to feel more confident in these skills upon program completion. Seeing more students indicate plans to utilize these skills would suggest that our program and methods courses have given them confidence in their data analytics skills and that skill-building through the proposed improvements has occurred.

ITS will measure the effectiveness of the teaching technology and instructional software in the lab through end-of-course surveys of instructors and students. Improvements to the configuration and capabilities will be planned based upon this feedback. Overall impact of the Lab will be gauged by the number of courses each term utilizing the Lab, and the number of students enrolled in those courses, as well as usage of the Lab outside scheduled courses by other students and researchers making use of the Lab's capabilities.

6) Resources for the project and projected ongoing resource needs (total cost of ownership for the life of the project) including:

- a) Any hardware requirements (which should comply with standards established by the ITPAC (Information Technology Planning and Advisory Committee)).

ITS will configure desktop and laptop computers in accord with computer lab refresh computer standards. Instructor podium equipment will conform to eClassroom technology standards, with special additions for the Crestron Airmedia system.

Add 12 student computers to Lab (for 48 total)	\$18,000
Tables/pods for additional computers (for 12 pods total)	\$3,000
10 Asus laptop computers for Classroom	\$10,000
Instructor podium and sound system	\$31,800
Crestron Airmedia system and displays	\$77,000
Other teaching equipment (e.g., whiteboards)	\$2,500
Infrastructure needs (data, electrical, etc.)	\$19,000
Supporting equipment (cables, etc.)	\$5,500
Professional services (installation, programming, etc.)	\$30,500

Hardware and furnishings total: \$197,300

- b) Any software requirements (which should comply with standards established by the ITPAC (Information Technology Planning and Advisory Committee).

Costs listed below are based on one instructor license and 48 student computer licenses.

Additional SPSS licenses	\$24,000
Data Analysis Tool Pak for Excel	\$0
Content Analysis Software (price based on WordStat)*	\$29,000
Tableau for Instruction	\$0
<u>Government and Political Science Datasets**</u>	<u>\$2,000</u>
Total software and data costs:	\$55,000

(Note: Some of these costs are still working estimates. Any unused funds will be returned to the Technology Fee Committee. SPSS presents a special challenge as it is a recurring annual cost; ITS will attempt to merge ongoing SPSS costs into the academic software support budget.)

* Content Analysis software - e.g. Nvivo10, SPSS Text Analysis add on, QDAP, WordStat (compatible with Excel or SPSS is key) – is for qualitative analysis of speeches, newspaper articles, political party manifestoes, transcribed interviews, etc.

** Datasets, organized ready for use (Polity IV, Comparative Manifesto Project, American National Election Study, World Values Survey, Failed State Index, Freedom House)—these are typically free but some may have associated costs.

- c) Any personnel costs – only OPS and other time-limited appointments, non-recurring.

Training for political science faculty in the technology of the data analytics lab will enable full faculty utilization of the advanced technological capabilities of the data analytics lab. This next generation smart classroom as proposed here has many features to facilitate active learning, collaborative student analysis, and communication across pods or groups within the classroom setting. While taking UWF to the next generation in data analytics education, it will require faculty training to optimize use.

Training for political science faculty in Tableau for visual data analytics would enhance our ability to make use of this tool for data analytics with no additional licensing costs for this software. Tableau has advanced graphics capabilities to generate a variety of visual output forms quickly. Still it also has import/export compatibility with Excel and other comma delimited (csv) formats of data organization. Most political science data can be obtained in csv formats.

Training in Technology and Tableau for faculty: \$10,000

A lab technician, who could be a graduate student (preferably) or OPS person, to manage and setup datasets on lab computers for student use would be needed in the first three terms. This technician would be hired by the Department of Government, but would also perform some lab support functions for ITS. This individual would be responsible for organizing the data from large datasets and putting it into column and row form to manipulation of variables by students in the lab. This can be incredibly time consuming in large N, multivariate datasets and may be difficult to accomplish with undergraduates given lab time constraints. Fifteen hours per week would suffice for this purpose during the initial startup and lab configuration phase in the first two semesters. Third and fourth semesters may require less time; ten hours per week could suffice.

Fall Term 2015:	15 hours weekly at \$12/hour, for 16 weeks	\$2,880
Spring Term 2016:	15 hours weekly at \$12/hour, for 16 weeks	\$2,880
Fall Term 2016:	10 hours weekly at \$12/hour, for 16 weeks	\$1,920
Fall Term 2017:	10 hours weekly at \$12/hour, for 16 weeks	\$1,920
Total lab technician cost:		\$9,600

Costs summary, total two-year project:

Lab hardware and furnishings	\$197,300
Software and data sets	\$55,000
Faculty training in technology and Tableau	\$10,000
OPS Lab Technician, 4 semesters	\$9,600
Contingency	\$8,100
Total 2-year project cost:	\$280,000

7) Proposed Timeline for the project with major milestones and project end dates.

This project would run from summer 2015 through spring 2017 over two years of implementation. ITS will remodel and refurbish SAIL during Summer 2015 in order to provide the Data Analytics Laboratory.

Fall 2015

-open the data analytics classroom with two courses meeting there for each class session (1) PUP3008 Analyzing Political Issues (research methods course for undergraduates), and (2) POS6704 Political Science Research Methods (MA level). Work with two comprehensive datasets with students in the lab. Develop and add additional assignments for active, collaborative learning in the lab.

Spring 2016

-organize, prepare and add assignments engaging students with two additional large, comprehensive datasets in the spring INR3073 Analyzing International Political Issues course. Develop and add additional assignments for active, collaborative learning in the lab.

Fall 2016

-add visual data analytics and qualitative methods (1st of 2 in a new research methods sequence) course to offerings as a first step course in data analytics POS4990 Data Analytics of International Issues. Shift quantitative methods course to spring semester. Cross-list this course to offer at the graduate level as POS5990 Data Analytics for International Issues with additional class meetings, assignments, readings and work appropriate for graduate level students.

Spring 2017

- Offer the redesigned second sequence quantitative analysis course POS4991 Data Analysis of Political Issues II, (now a 2nd of 2 courses in a new sequence). Cross-list the course as a graduate elective course as POS5991 Data Analysis of Political Issues II with additional class meetings, assignments, readings and work appropriate for graduate level students.

8) Plan for sustainability of the project beyond the initial project period if applicable.

Once configured, the Department of Government will continue to use the lab and plans to expand data analytics courses in its course offerings to enhance student skill-building and professional development moving forward.

Additionally, this facility holds great promise across campus. The co-investigators of this project, ITS will reach out to other disciplines in the social sciences, business, and education at UWF to explore potential data analytics applications in these disciplines. ITS will identify the best partners and appropriate times for bringing other disciplines into the data analytics lab with appropriate configuration of the lab software moving forward from the pilot program with Department of Government.

The SAIL lab is already part of the ongoing computer labs refresh cycle. Reconfigured as the Data Analytics Laboratory, the DAL is a combined student lab and teaching space. ITS will include refresh of the student computer pods as part of the computer lab cycle, and the teaching and other instructional technology as part of the classroom refresh cycle.

It is also anticipated that ITS will generate a smaller “Data Analytics Laboratory Phase 2” systemic proposal in either 2016 or 2017 to fine-tune some elements of the Laboratory based on initial usage experiences of students and faculty.

9) Resource matching which might be provided by organizations with appropriate commitment authority documentation.

ITS will seek grant support from Crestron related to showcasing their technology in the Data Analytics Laboratory setting. If such support is acquired, this will defray some of the costs of the Airmedia equipment, and equivalent technology fee funds will be returned to the Committee from this project.

10) Individual responsible for reporting and accountability

Implementation of this proposal is led by the Department of Government, Dr. Michelle Hale Williams providing accountability, with ITS in a supporting role. ITS will implement the renovation and alteration of SAIL to serve as the Data Analytics Laboratory.

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