



# ASSOCIATION FOR INSTITUTIONAL RESEARCH

Data and Decisions for Higher Education

[Back to All Proposals](#)

## PROPOSAL DETAILS

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### Project Description I

Title:

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Data-driven support for students on the path to college: Development of a trajectory model to promote informed and prepared candidates

Statement of the research problem and national importance:

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The path to college consists of a complex set of choices and achievements completed over a long period of time. Middle and high school students working with their parents, teachers, and counselors are often unable to estimate the consequences of various decisions on their career trajectories and are unaware of the linkages between decisions made "today" and choices that might be available in the future. Having an early plan increases the likelihood of students taking appropriate college preparatory coursework and ultimately enrolling in a postsecondary institution (Cabrera & La Nasa, 2000a). More often than not, however, considerations of college plans do not happen until students' junior or senior years when the pool of potential colleges has already been limited by past decisions. Though colleges and universities make data about admissions requirements readily available to potential applicants, students early in their

high school careers rarely recognize this abundance of materials and likely are unable to process how those data points can help them make informed decisions to position themselves for the future.

High school guidance counselors can be excellent resources for guiding college-bound students through a set of logical decisions. However, some carry case loads of up to 1,000 students (American School Counselor Association, 2008), and many are uninformed about the college admissions process (Perez & McDonough, 2008). Though some families enlist the services of consultants to help poise college applicants for success, these individuals are typically involved only during the college application time frame and can only be afforded by a small segment of the student population. A general lack of direction and guidance is exacerbated for many low-income students who lack individual attention from such supporters for their entire high school careers. Because these students must generally overcome even more barriers than middle- and upper-income students (Cabrera & La Nasa, 2000a), it is especially important to help low-income students access and process data effectively so that they can continually be positioning themselves for college throughout their high school careers rather than solely in their senior year. Because such a complex problem is unequally experienced by certain segments of the population, President Obama's administration is seeking ways to make more information about postsecondary education available to help students and families make informed decisions. Our proposed research takes up this challenge of bringing data directly to students and families in an easy-to-use manner to help them make important and difficult decisions.

In this project, our research team will develop a decision-support tool for college planning for students focused on their academic, extracurricular, and community service portfolios. This tool, built around data-driven statistical models of individual student trajectories to college, may enable students to make positive choices (and counselors to give appropriate advice) to strengthen prospects for college education. An individually tailored model could feasibly transform the college preparation process by providing students with data so they begin planning early in their high school careers when they still have the opportunity to affect college admissions outcomes. The model will be built from a state-level educational dataset including variables related to high school experiences and the college admissions process as well as postsecondary work or institutional placement. Specifically, we seek to address the following:

- Using an extensive state-level dataset, what combination of variables throughout the trajectory of students' high school years influences the likelihood of various postsecondary options at each time step?

Developing a decision-support model without considerations of dissemination and individual usage would be a fruitless effort. Thus, in addition to building the statistical model, we also propose to research effective ways to disseminate such information to students, parents, and guidance counselors. Drawing on techniques used to influence human behavior in the health field, we will explore how to convert model results into individually tailored information. Placing data in the hands of potential users in a way to spark interests and ultimately affect decision-making processes is essential for such educational research to be worthwhile. Specifically, we seek to address the following:

- How can decision-support data related to choices that influence postsecondary options be effectively conveyed and communicated to promote usage by high school students?

In summary, our proposed project integrates data analytics and decision-support research and applies those knowledge bases to address an important educational access issue. Implementing new methods and technologies can allow for continuous, data-driven support for all students throughout their high school careers in preparation for college.

Review the literature and establish a theoretical grounding for the research:

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THERE IS A VAST LITERATURE RELATED TO THE COLLEGE PATHWAY, COLLEGE CHOICE, AND APPLICATION PROCESS. MANY RESEARCHERS HAVE SHOWN THAT A STUDENT'S LEVEL OF ACADEMIC PREPARATION IN HIGH SCHOOL POSITIVELY RELATES TO COLLEGE ENROLLMENT (ALON, 2005; ALWIN & OTTO, 1977; ALEXANDER, PALLAS & HOLUPKA, 1987; BERKNER & CHAVEZ, 1997; HOSSLER, BRAXTON & COOPERSMITH, 1989; ST. JOHN, 1991; PERNA, 2000), REPRESENTATION AT

SELECTIVE COLLEGES AND UNIVERSITIES (HORN & KOJAKU, 2001), AND ACADEMIC SUCCESS IN COLLEGE (E.G., NOBLE & SAWYER, 2004; SWAIL, REDD & PERNA, 2003). OTHER RESEARCHERS FOCUS ON HOW CERTAIN DEMOGRAPHIC GROUPS FACE UNIQUE BARRIERS TO ENROLLMENT. RELATIVE TO STUDENTS WHOSE PARENTS ATTENDED SOME FORM OF POST-SECONDARY EDUCATION, FOR EXAMPLE, FIRST-GENERATION STUDENTS HAVE LESS ACCESS TO RESOURCES ABOUT COLLEGE PREPARATION AND PLANNING FROM FAMILY MEMBERS (BOWEN & BOK, 1999; CABRERA & LA NASA, 2000b; FLINT, 1993; GONZÁLEZ, STONER, & JOVEL, 2003). CONCURRENTLY, THESE STUDENTS ARE NO MORE LIKELY THAN THEIR PEERS TO RECEIVE ADDITIONAL ASSISTANCE FROM RESOURCES WITHIN THEIR HIGH SCHOOLS WITH THE EXCEPTION OF CHOOSING A SENIOR-YEAR MATH CLASS AND APPLYING FOR FINANCIAL AID (U.S. DEPARTMENT OF EDUCATION, 2000), WHEN OPPORTUNITIES TO POSITION ONESELF FOR A VARIETY OF COLLEGE OPTIONS HAVE LONG PASSED. THUS, THESE PAST STUDIES SHOW THAT A SEGMENT OF THE POPULATION HAS LIMITED ACCESS TO APPROPRIATE DATA FOR PROMOTING COLLEGE PREPAREDNESS.

THE COLLEGE CHOICE LITERATURE BROADLY FOCUSES ON STUDENTS' ASPIRATION, SEARCH, AND CHOICE PROCESSES (HOSSLER ET AL., 1989; HOSSLER AND GALLAGHER, 1987), WITH MUCH OF THE COLLEGE PATHWAY RESEARCH FOCUSED ON ASPIRATION AND CHOICE ASPECTS (PERNA, 2006). ECONOMETRIC COLLEGE-CHOICE MODELS (E.G., CARD & KRUEGER, 2005; MANKSI & WISE, 1983), FOR EXAMPLE, ASSUME THAT STUDENTS MAKE APPLICATION AND ENROLLMENT DECISIONS IN A RATIONAL, INFORMED MANNER. DECISIONS ARE MADE BASED ON ODDS OF ADMISSION, LIKELIHOOD OF SUCCESS, AND RETURNS ANTICIPATED FROM EDUCATIONAL ATTAINMENT OVER A LIFETIME (DOMINA, 2009). CONTRASTINGLY, SCHOOL-WIDE OUTREACH PROGRAMS THAT SEEK TO IMPROVE EDUCATIONAL OUTCOMES FOR ALL STUDENTS ASSUME THAT THE FORMATION OF EDUCATIONAL ASPIRATION IS A SOCIAL PROCESS (DOMINA, 2009). SUCH PROGRAMS BELIEVE THAT HIGH SCHOOLS, IN PARTICULAR TEACHER EXPECTATIONS AND AN INFLUENTIAL PEER ENVIRONMENT, PLAY AN IMPORTANT ROLE IN DETERMINING HOW STUDENTS WILL POSITION THEMSELVES FOR COLLEGE (KAHNE & BAILEY, 1999; RODERICK, NAGAOKA, COCA, & MOELLER, 2008). SUCH SCHOOL-WIDE PROGRAMS, HOWEVER, OFTEN FAIL TO IDENTIFY THE STUDENTS WHO STAND TO BENEFIT THE MOST FROM A PROGRAM UNLIKE MORE TARGETED OUTREACH PROGRAMS (DOMINA, 2009). OUR STUDY SEEKS TO BRIDGE THESE PARADIGMS BY PROVIDING LIKELIHOOD OF SUCCESS DATA INDIVIDUALLY TO STUDENTS THROUGH A MEDIUM THAT COULD LEVERAGE THE PEER ENVIRONMENT TO MAKE COLLEGE PREPAREDNESS AND PLANNING A MORE SOCIAL PROCESS.

OTHER RESEARCHERS HAVE EXAMINED THE STEP-BY-STEP PROCESS THAT STUDENTS MUST FOLLOW IN APPLYING TO COLLEGES. KLASIK (2012) CONSIDERED EACH STEP ON THE PATH TO ENROLLMENT AS A POTENTIAL BARRIER TO REACHING THAT GOAL. HE APPLIED HUMAN CAPITAL THEORY AND ASSERTED THAT STUDENTS ESSENTIALLY UNDERTAKE A COST-BENEFIT ANALYSIS AT EACH STEP TO DETERMINE WHETHER OR NOT EFFORT IS WARRANTED. IN ADDITION, HE APPLIED CULTURAL AND SOCIAL CAPITAL THEORY BECAUSE SOME STUDENTS MAY BE DISADVANTAGED IN NOT KNOWING HOW TO NAVIGATE THE STEPS (KLASIK, 2012). THOUGH THERE WERE DIFFERENCES IN THE NUMBER OF STEPS COMPLETED ACROSS DEMOGRAPHIC GROUPS, MANY OF THESE DIFFERENCES WERE REDUCED WHEN ACADEMIC ABILITY WAS TAKEN INTO ACCOUNT. SIMILARLY, AVERY AND KANE (2004) FOUND THAT AT-RISK STUDENTS COMPLETED FEWER STEPS THAN MORE PRIVILEGED STUDENTS. AS COLLEGE COUNSELORS CAN BE INVALUABLE SOURCES OF INFORMATION (MCDONOUGH, 2005; PLANK & JORDAN, 2001), STUDENTS WHO MEET WITH A COLLEGE COUNSELOR AND HAVE ACCESS TO COLLEGE PREPAREDNESS DATA ARE MORE LIKELY TO COMPLETE THE NECESSARY SERIES OF STEPS.

SIMILARLY, WE CONSIDER THE COLLEGE PREPARATION, SEARCH, AND APPLICATION PROCESS TO BE A SERIES OF STEPS OR DECISIONS OCCURRING THROUGHOUT A STUDENT'S TIME IN HIGH SCHOOL. BOTH ACADEMIC AND EXTRA-CURRICULAR OPTIONS AND DECISIONS ARE VAST IN QUANTITY AND SPREAD OVER TIME—SUCH COMPLEX, INTERCONNECTED, AND SEEMINGLY DISTANT PIECES OF DATA MAY NOT BE APPARENT TO AN UNSUSPECTING HIGH SCHOOL FIRST-YEAR STUDENT. TO ORGANIZE THIS CONUNDRUM WITHIN A FRAMEWORK, WE CONCEPTUALIZE OUR STUDY USING SIMON'S (1955, 1956) NOTION OF BOUNDED RATIONALITY, WHICH ASSUMES THAT INDIVIDUALS ARE UNABLE TO SCAN ALL INFORMATION AND THEREBY HAVE A DISTORTED PERCEPTION OF REALITY. HUMAN COGNITIVE CAPABILITIES ARE SIMPLY LIMITED IN THE EXTENT TO WHICH ALL ALTERNATIVES AND DATA CAN BE CONSIDERED, OPTIMIZATION CAN BE ACHIEVED, ATTENTION CAN BE

ALLOCATED, AND NUMBER OF CRITERIA THAT CAN BE MET IN MAKING DECISIONS (CYERT & MARCH, 1963; MARCH & SIMON, 1958). AS SUCH, MANY INDUSTRIES AND SECTORS HAVE DEVELOPED DECISION-SUPPORT MODELS TO HELP GUIDE USERS THROUGH UNCERTAINTY AND CONSIDER AN ARRAY OF DATA POINTS. APPLYING THIS FRAMEWORK TO STUDENTS' DECISION-MAKING DURING HIGH SCHOOL, WE PROPOSE TO SIMPLIFY VARIOUS ALTERNATIVES AT EACH TIME STEP BY DEVELOPING A COMPLEX MODEL LINKING DECISIONS TO LIKELIHOOD OF APPLICATION SUCCESS AT VARIOUS COLLEGES AND UNIVERSITIES AND PACKAGING THESE DATA FOR STUDENTS, PARENTS, AND COUNSELORS IN AN EASY-TO-USE FORMAT TO GUIDE EMPIRICALLY SUPPORTED DECISIONS.

IN SUMMARY, RESEARCHERS HAVE FOCUSED ON VARIABLES ENHANCING THE LIKELIHOOD OF ENROLLMENT AND ACHIEVEMENT, THE TYPES OF COLLEGE CHOICE AND OUTREACH MODELS, AND STEPS OF THE COLLEGE APPLICATION PROCESS. THERE IS A DEARTH OF RESEARCH, HOWEVER, RELATING DIFFERENT ACADEMIC TRAJECTORIES THROUGHOUT HIGH SCHOOL TO THE LIKELIHOOD OF SUCCESS IN APPLYING TO DIFFERENT INSTITUTIONS AND EVEN LESS RESEARCH ON THE WAYS IN WHICH DATA CAN BE PRESENTED TO STUDENTS SO THAT THEY ADOPT MORE INFORMED DECISION-MAKING AND PLANNING. OUR STUDY WILL FILL THIS GAP AND PRODUCE NEW INSIGHT ON HOW THE COLLEGE APPLICATION PROCESS CAN BE MORE DATA-DRIVEN AND INDIVIDUALIZED FOR STUDENTS THROUGHOUT THEIR TIME IN HIGH SCHOOL. AS KLASIK (2012) NOTES, "IT IS IMPORTANT TO RECOGNIZE THE IMPACT THE COMPLETION OF EARLY STEPS IN THE PROCESS HAS ON THE COMPLETION OF LATER STEPS . . . PROGRAMS THAT TARGET STUDENTS EARLY IN THEIR HIGH SCHOOL CAREER HELP FOSTER THEIR COLLEGE ASPIRATIONS INTO TWELFTH GRADE" (P. 544). WE WILL SHOW HOW VARIOUS PERFORMANCE INDICATORS AND DECISIONS MADE ALONG THE HIGH SCHOOL TRAJECTORY INFLUENCE THE POOL OF POSTSECONDARY OPTIONS AVAILABLE TO STUDENTS AND FEED THAT INFORMATION DIRECTLY TO STUDENTS.

Describe the research method that will be used:

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THIS STUDY WILL DRAW ON DATA FROM THE VIRGINIA LONGITUDINAL DATA SYSTEM (VLDS), A NEWLY CONSTRUCTED DATA SYSTEM THAT COMPILES STUDENT-LEVEL DATA FROM ALL K-12 STUDENTS IN THE COMMONWEALTH OF VIRGINIA. OUR RESEARCH ORGANIZATION HAS BEEN GRANTED EARLY ACCESS TO THE SYSTEM TO PARTICIPATE IN ITS PILOT LAUNCH SPECIFICALLY TO INVESTIGATE THIS PROJECT'S RESEARCH QUESTION. VARIABLES (ALL DE-IDENTIFIED FROM INDIVIDUAL STUDENTS) AT THE TEMPORAL RESOLUTION OF A SEMESTER INCLUDE THE FOLLOWING: STUDENT DEMOGRAPHIC INFORMATION, HIGH SCHOOL ATTENDED, GRADE POINT AVERAGE, COURSE ENROLLMENTS, COURSE PERFORMANCE (I.E., TRANSCRIPT), NATIONAL STANDARDIZED TEST SCORES, VIRGINIA STANDARDIZED TEST SCORES, AP COURSE TAKING, AP TEST SCORES, POSTSECONDARY OUTCOME (I.E., NONE, SPECIFIC VIRGINIA INSTITUTION, OR OUT OF STATE). THESE DATA WILL BE SUPPLEMENTED WITH AVAILABLE DATA RELATED TO ADMITTED STUDENTS' ENTERING PRE-COLLEGE (PERSONAL AND ACADEMIC) CHARACTERISTICS AS SUPPLIED BY COLLEGE AND UNIVERSITY INSTITUTIONAL RESEARCH OFFICES. THESE DATA ARE READILY AVAILABLE ON INSTITUTIONS' WEBSITES AS WELL AS FROM THE INTEGRATED POSTSECONDARY EDUCATION DATA SYSTEM. EACH OF THE VIRGINIA ADMISSIONS AND INSTITUTIONAL RESEARCH OFFICES WILL ALSO BE CONTACTED THROUGHOUT THE PROJECT'S DURATION TO BUILD DATA SHARING PARTNERSHIPS. AS POSTSECONDARY INSTITUTIONS RECOGNIZE THAT A FUNCTIONAL DECISION-SUPPORT MODEL COULD HELP THEM REACH PREVIOUSLY INACCESSIBLE STUDENTS EARLIER IN THEIR HIGH SCHOOL CAREERS, THEY MAY BE MORE FORTHCOMING WITH PROVIDING DATA RELATED TO THEIR SUCCESSFUL AND UNSUCCESSFUL APPLICANT POOLS TO HELP REFINE AND ENHANCE THE MODEL'S COMPLEXITY.

TO ADDRESS THE FIRST RESEARCH QUESTION, WE WILL COMPLETE ANALYSES IN TWO PHASES:

*PHASE 1: TRAINING PHASE*

WE WILL FIRST EXAMINE STUDENTS' ACADEMIC "TRAJECTORIES" THROUGHOUT HIGH SCHOOL (COMPRISED OF THE VARIABLES LISTED ABOVE) AND DETERMINE HOW THOSE TRAJECTORIES ARE RELATED TO THEIR LIKELIHOOD OF APPLICATION SUCCESS AT VARIOUS POSTSECONDARY OPTIONS WITHIN THE COMMONWEALTH OF VIRGINIA (LOCATION CHOSEN BECAUSE OF DATA AVAILABILITY). USING AVAILABLE VARIABLES FOR EACH TIME STEP (EIGHT SEMESTERS OF HIGH SCHOOL),

WE WILL UTILIZE CLUSTER ANALYSIS TO CATEGORIZE STUDENTS INTO DIFFERENT ACADEMIC TRAJECTORY TYPES. THIS STATISTICAL TECHNIQUE WILL MAXIMIZE THE VARIANCE *BETWEEN* GROUPS OF TRAJECTORIES BUT MINIMIZE THE VARIANCE *WITHIN* A SINGLE TRAJECTORY. FOR EACH CLUSTER, WE WILL EXAMINE THE CENTROIDS, (I.E., ESSENTIALLY THE AVERAGES OF EACH VARIABLE FOR A CLUSTER) AT THE HIGH SCHOOL GRADUATION TIME STEP AND COMPARE THOSE TO ADMISSIONS DATA FROM EACH COLLEGE AND UNIVERSITY IN VIRGINIA. WE CAN THEN DETERMINE THE LIKELIHOOD OF ACCEPTANCE FOR STUDENTS IN EACH CLUSTER BY COMPARING CENTROID VALUES TO ADMISSIONS CRITERIA. ONCE LIKELIHOOD SCORES ARE DETERMINED FOR EACH CLUSTER FOR EACH INSTITUTION, WE WILL STEP BACK IN TIME THROUGH EACH CLUSTER'S TRAJECTORY TO DETERMINE WHICH COMBINATION OF DATA POINTS THROUGHOUT STUDENTS' HIGH SCHOOL YEARS INFLUENCES THE LIKELIHOOD FOR VARIOUS POSTSECONDARY OPTIONS.

#### *PHASE 2: TESTING PHASE*

A RANDOM SUBSET OF STUDENTS IN THE DATA BASE WILL BE WITHHELD FOR TESTING PURPOSES. FOLLOWING MODEL REFINEMENT ON THE TRAINING DATA, WE WILL APPLY DISCRIMINANT FUNCTION ANALYSIS TO PLACE STUDENTS FROM THE TESTING DATA SUBSET INTO ALREADY ESTABLISHED CLUSTERS BASED ON THEIR STUDENT-LEVEL VARIABLES. THIS PROCEDURE WILL COMPARE EACH TESTING STUDENT'S ACADEMIC TRAJECTORY WITH THE TRAJECTORY ASSOCIATED WITH EACH CLUSTER AND FIND THE CLOSEST MATCH. THE TESTING STUDENTS' ACTUAL POSTSECONDARY OUTCOME (KNOWN FROM THE VLDS DATABASE) WILL BE COMPARED TO THE LIKELIHOOD OF ACCEPTANCE SCORE ASSOCIATED WITH THAT INSTITUTION FOR THAT CLUSTER TO VALIDATE THE MODEL DEVELOPED IN THE TRAINING PHASE. ADDITIONAL DATA (FROM POSTSECONDARY INSTITUTIONS OR FROM THE STATE'S DATA BASE AS IT BECOMES MORE DEVELOPED) SHOULD CONTINUALLY IMPROVE THE MODEL'S PREDICTIVE POWER.

TO ADDRESS THE SECOND RESEARCH QUESTION, WE WILL CONDUCT INTERVIEWS AND FOCUS GROUPS WITH GUIDANCE COUNSELORS, PARENTS, AND STUDENTS FROM MULTIPLE CASE STUDY HIGH SCHOOLS ACROSS VIRGINIA. SCHOOLS WILL BE INVITED TO PARTICIPATE SO THAT SITES REPRESENT A CROSS-SECTION OF THE COMMONWEALTH, INCLUDING A SITE FROM NORTHERN VIRGINIA IN THE WASHINGTON, D.C. SUBURBS, THE TIDEWATER AREA, AN INNER-CITY SITE IN RICHMOND, A CHARLOTTESVILLE SCHOOL HEAVILY INFLUENCED BY A UNIVERSITY, AND A SITE FROM RURAL SOUTHWESTERN VIRGINIA. THE OBJECTIVE OF THESE VISITS WILL BE THREE-FOLD, ALL WORKING TOWARD THE GOAL OF IDENTIFYING A METHOD OR PLATFORM FOR DISSEMINATING THE DATA THAT SPURS INTEREST, AND ULTIMATELY USAGE, AMONG STUDENTS. FIRST, WE WILL DETERMINE THE EXTENT TO WHICH STUDENTS AND PARENTS CONSIDER DATA IN THE COLLEGE PREPARATION PROCESS AND ESPECIALLY FOCUS ON THE TIMING OF THOSE CONSIDERATIONS OVER THE COURSE OF A STUDENT'S HIGH SCHOOL CAREER. SECOND, WE WILL PRESENT RESULTS FROM THE MODELING WORK DESCRIBED PREVIOUSLY SO THAT STUDENTS CAN "PLACE THEMSELVES" WITHIN A CLUSTER TRAJECTORY SO THEY CAN SEE THE ASSOCIATED LIKELIHOOD OF ACCEPTANCE AT VARIOUS INSTITUTIONS. PARTICIPANTS WILL BE ASKED TO REFLECT ON THE USEFULNESS OF SUCH INFORMATION AND ITS POTENTIAL FOR INFLUENCING DECISION-MAKING AND BEHAVIOR. THIRD, WE WILL PILOT SEVERAL DIFFERENT DECISION-SUPPORT TOOL APPROACHES WITH THE PARTICIPANTS IN AN EFFORT TO DETERMINE THE MOST EFFECTIVE DISSEMINATION SCHEME. THESE WILL INCLUDE, FOR EXAMPLE, A WEB-BASED PLATFORM MODELED AFTER POPULAR SOCIAL MEDIA SITES (SEE APPENDIX 1 FOR AN EXAMPLE) AND AN INDIVIDUALLY TAILORED EMAIL MESSAGE THAN CAN BE AUTOMATICALLY GENERATED FOR A SPECIFIC INSTITUTION OF INTEREST (SEE APPENDIX 2 FOR AN EXAMPLE). THE GOAL OF BOTH OF THESE FORMS OF DISSEMINATION IS TO TAKE COLLEGE READINESS DATA AND MAKE IT ACCESSIBLE AND ENGAGING FOR HIGH SCHOOL STUDENTS.

Interviews and focus group sessions will be recorded and transcribed so that appropriate qualitative analyses can be conducted. The research team will code each transcript in NVivo (v.9.0), a software package for qualitative data analysis and management. We will use standard content analysis (Diesing, 1971; Lincoln & Guba, 1985; Strauss, 1987; Taylor & Bogdan, 1984) following a grounded theory approach (Glaser & Strauss, 1967; Strauss & Corbin, 1994), whereby codes will emerge from the data. Codes will be compiled into a master code book, and similar codes will be collapsed together as appropriate. As the decision-support tool for effectively communicating college readiness data to students will still be in its early-development stage, using qualitative methods is appropriate for addressing the second research question for this project.

Uploaded Appendix Document(s):

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- [Appendix 1 and 2](#)

### Project Description II

Will you use NCES target dataset? No

Please check all NCES datasets that apply

Explain why each dataset best serves this research. Include a variable list for each dataset used.

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Will you use NSF target dataset? No

Explain why each dataset best serves this research. Include a variable list for each dataset used.

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Will you address the NPEC focus topic? Yes

If yes, please briefly describe:

The proposed study addresses the NPEC focus topic in a number of ways. Addressing the first research question will determine what college preparedness data should be provided directly to students at each step of their high school academic trajectories. Empirically determining significant predictors on the likelihood of acceptance at various institutions will parse the number of variables down to a manageable number as students consider alternate options in becoming positioned for postsecondary education. Our second research question directly addresses how students and their families use and have access to such data. We are especially interested in determining how data use may change over a student's time in high school and aim to broaden the period during which these data are taken into consideration. In addition, our second research question addresses how these data can be presented to students to maximize interpretability, usage, and effectiveness. By presenting data in a variety of decision-support style prototype platforms developed within the scope of this project, students and families will react to concrete data dissemination approaches. Analyses of their responses will provide guidance on the most effective approach for sparking positive changes in decision-making, planning, and positioning. Furthermore, our purposeful selection of case study institutions for piloting these dissemination approaches will allow us to determine how usage and effectiveness may vary across different segments of the population. Delivering these college preparedness data in an individualized manner will tailor information so students can visualize the impact of current decisions on future options.

### Project Description III

Provide a timeline of key project activities:

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2013:

FEBRUARY: ACCESS GRANTED TO VIRGINIA LONGITUDINAL DATA SYSTEM (VLDS)

MARCH: DATA EXTRACTION FROM VLDS AND FROM UNIVERSITY ADMISSIONS/INSTITUTIONAL RESEARCH/IPEDS

APRIL: PRELIMINARY MODELING EFFORT TO ADDRESS RESEARCH QUESTION #1

APRIL: FUNDING DECISION FOR AIR PROPOSAL

MAY: OFFICIAL COMMENCEMENT OF AIR GRANT FUNDING

MAY: DEVELOP PROTOCOLS FOR INTERVIEWS AND FOCUS GROUP SESSIONS FOR ADDRESSING RESEARCH QUESTION #2 AND SUBMIT APPLICATION FOR IRB APPROVAL

MAY–JUNE: PRODUCE FINAL MODELS FOR ADDRESSING RESEARCH QUESTION #1

JUNE: DISSEMINATE MODELING APPROACH AND RESULTS TO POSTSECONDARY INSTITUTIONS TO SEEK ADDITIONAL DATA ON THEIR SUCCESSFUL AND UNSUCCESSFUL APPLICANT POOLS

JULY: REFINE MODEL FOLLOWING ADDITIONAL DATA ACQUISITION

AUGUST: DEVELOP EASY-TO-USE, DECISION-SUPPORT STYLE PROTOTYPE PLATFORMS FOR DELIVERING DATA TO STUDENT USERS

SEPTEMBER–DECEMBER: CONDUCT INTERVIEWS AND FOCUS GROUPS WITH CASE STUDY HIGH SCHOOLS TO ADDRESS RESEARCH QUESTION #2

2014:

JANUARY: TRANSCRIBE AND CODE QUALITATIVE DATA

FEBRUARY: COMPLETE ANALYSIS OF QUALITATIVE DATA

MARCH: ADJUST THE PROTOTYPE PLATFORM IN LIEU OF THE FINDINGS FROM THE QUALITATIVE ANALYSES—THIS WILL BE A PROJECT DELIVERABLE

APRIL: PRODUCE TWO SCHOLARLY JOURNAL ARTICLES (ONE ADDRESSING EACH RESEARCH QUESTION) FOR DISSEMINATION

MAY: PRESENTATION OF RESULTS AT THE AIR FORUM IN ORLANDO, FL



JUNE: FINAL REPORT SUBMISSION TO AIR

JUNE: DISSEMINATE A FINAL REPORT DIRECTLY TO POSTSECONDARY INSTITUTIONS IN VIRGINIA, PARTICIPATING CASE STUDY HIGH SCHOOLS, AND THE VIRGINIA DEPARTMENT OF EDUCATION

FUTURE RESEARCH: PENDING FEEDBACK FROM VIRGINIA USERS, CONSIDER DISSEMINATING THE REPORT TO OTHER STATES AND POSTSECONDARY INSTITUTIONS

List deliverables such as research reports, books, and presentations that will be developed from this research initiative:

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REPORT TO THE VIRGINIA DEPARTMENT OF EDUCATION ON A BENEFICIAL APPLICATION OF THE VIRGINIA LONGITUDINAL DATA SYSTEM

STATISTICAL MODEL OF THE RELATIONSHIP BETWEEN HIGH SCHOOL STUDENTS' ACADEMIC TRAJECTORIES AND LIKELIHOOD OF ACCEPTANCE AT VARIOUS POSTSECONDARY INSTITUTIONS

PROTOTYPE PLATFORM FOR DISSEMINATING INDIVIDUALIZED COLLEGE PREPAREDNESS DATA DIRECTLY TO STUDENT AND FAMILY USERS

MID-YEAR REPORT TO AIR

PRESENTATION OF RESEARCH AT THE AIR FORUM

FINAL REPORT TO AIR

TWO SCHOLARLY JOURNAL ARTICLES, EACH ADDRESSING ONE OF THE STUDY RESEARCH QUESTIONS

FINAL PROJECT REPORT FOR POSTSECONDARY INSTITUTIONS IN VIRGINIA

FINAL PROJECT REPORT FOR PARTICIPATING CASE STUDY HIGH SCHOOLS

FINAL PROJECT REPORT FOR THE VIRGINIA DEPARTMENT OF EDUCATION

Describe how you will disseminate the results of this research:

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OUR PLAN FOR DISSEMINATING RESULTS PURPOSEFULLY TARGETS A VARIETY OF STAKEHOLDERS AND AUDIENCES. WE WILL MEET THE AIR GRANT OBLIGATIONS BY PRESENTING PROJECT RESULTS TO THE INSTITUTIONAL RESEARCH COMMUNITY AT THE ANNUAL FORUM IN MAY 2014. IN ADDITION, WE WILL REACH A BROADER SEGMENT OF THE ACADEMIC COMMUNITY

THROUGH TWO SCHOLARLY JOURNAL ARTICLES, EACH ADDRESSING ONE OF THE PROJECT RESEARCH QUESTIONS. ENGAGING POSTSECONDARY INSTITUTIONS IN A DIALOGUE ABOUT THE BENEFITS OF PROVIDING DATA RELATED TO COLLEGE PREPAREDNESS DIRECTLY TO STUDENTS AND FAMILIES THROUGHOUT THEIR TIME IN HIGH SCHOOL WILL BE A MAJOR PROJECT EMPHASIS. RATHER THAN WAITING UNTIL THE PROJECT'S CONCLUSION, WE WILL DISSEMINATE MODELING RESULTS THROUGHOUT THE PROJECT'S DURATION TO ENGAGE WITH THESE STAKEHOLDERS SO THAT PRELIMINARY RESULTS MAY SPARK DATA COLLABORATIONS WITH INSTITUTIONS TO IMPROVE THE MODEL. WE WILL ALSO PROVIDE VIRGINIA POSTSECONDARY INSTITUTIONS AND CASE STUDY HIGH SCHOOLS WITH A FINAL PROJECT REPORT (NOTE: TRAVEL FUNDS REQUIRED FOR VISITING CASE STUDY HIGH SCHOOLS ARE INCLUDED IN THE PROJECT BUDGET). THESE STAKEHOLDERS MAY FIND RESULTS USEFUL IN DEVELOPING WAYS TO MORE EFFECTIVELY DISSEMINATE AND PROVIDE ACCESS TO COLLEGE PREPAREDNESS DATA. FINALLY, AN IMPORTANT ASPECT OF THIS PROJECT IS THE COLLABORATION WITH THE VIRGINIA DEPARTMENT OF EDUCATION. AS THE COMMONWEALTH OF VIRGINIA IS A LEADER IN USING EDUCATIONAL DATA TO IMPROVE STUDENT OUTCOMES, RESULTS FROM THIS INVESTIGATION WILL BE SHARED WITH THE STATE AGENCY TO INFLUENCE PRACTICE AND PROGRAMS AND POTENTIALLY LEVERAGE HOW THE VLDS CAN BE USED EFFECTIVELY TO PROVIDE DECISION-SUPPORT DATA DIRECTLY TO STUDENTS AND FAMILIES.

Provide a reference list of sources cited:

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#### IRB Statement

Statement of Institutional Review Board approval or exemption:

IRB approval for this research will be sought from the University of Virginia, as multiple members of the research team have affiliations at the institution. Our proposed methods pose no risk to participants, and reporting of findings addressing the second research question will not include identifying information. Because we do not propose to disrupt or manipulate the normal life experiences of subjects, incorporate any form of intrusive procedures, or involve deception, we anticipate that this project will be determined to be expedited/exempt from full committee review. If we receive funding for this project, we will then develop interview and focus group protocols and submit those with our IRB application. The Social and Behavioral Sciences review process takes place on a rolling basis at the University of Virginia, and the entire review generally takes only two weeks.

**Statement of Use of Restricted Datasets**

THIS PROPOSED PROJECT WILL NOT REQUIRE THE USE OF RESTRICTED DATASETS. WE HAVE ALREADY BEEN GRANTED ACCESS TO THE VIRGINIA LONGITUDINAL DATA SYSTEM (VLDS) WHICH DE-IDENTIFIES STUDENT-LEVEL DATA. IF NECESSARY, WE WILL REACH A DATA AGREEMENT WITH INDIVIDUAL POSTSECONDARY INSTITUTIONS THAT PROVIDE ADMISSIONS DATA RELATED TO THIS PROJECT.

**Biographical Sketch**

David Knight's Biography Sketch

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David B. Knight is the Chief Executive Officer and Research Associate with Pavilion Research, a non-profit research organization focused on investigating practical solutions for real-world problems using data-driven analytical techniques. An important attribute of the research team is its interdisciplinarity, with each researcher bringing a unique set of experiences and competencies to this project, including education research, high-powered statistical analyses and modeling, computer programming, decision-support tools, and human-interface design. As described in the Bio Sketch for David Hondula, the team of investigators from Pavilion Research has developed a track record for collaborating to address important educational issues.

Knight earned a doctorate in Higher Education from Pennsylvania State University where he worked as a research assistant in the Center for the Study of Higher Education. He also holds two Master's degrees from the University of Virginia in Environmental Science and Urban & Environmental Planning as well as a Bachelor's degree from Virginia in Environmental Science. In the sciences, he investigated socially relevant, applied problems (e.g., funded projects on biomass burning and safe water systems, applied climatology work on weather and human mortality and morbidity, and hurricane research on extreme rainfall events). Each of these studies required large-scale data collection, management, and statistical analyses. His first-authored research in the sciences has been published in *Journal of Geophysical Research-Atmospheres*, *Geophysical Research Letters*, and *Physical Geography*. In addition, he presented related research at professional meetings of the American Meteorological Society and Association of American Geographers.

Knight became interested in how universities could better address interdisciplinary problems and how undergraduate education in the STEM fields could be improved, leading him into Higher Education. At Penn State, Knight was responsible for managing two large-scale, multi-million dollar research efforts funded by the National Science Foundation: a nationally representative quantitative study of 120 programs at 31 institutions, and a qualitative analysis of six case studies. These projects focused on identifying the educational conditions that lead to high-quality learning outcomes in undergraduate engineering education and also investigated recruitment and retention issues for underrepresented students in engineering. Knight continued leading the NSF project as a researcher in the University of Michigan's Center for the Study of Higher and Postsecondary Education. In addition, he has worked on financial issues facing institutions of higher education and was the co-author on a project receiving funding from the Knight Commission on Intercollegiate Athletics to study the unsustainable nature of revenue patterns across athletics programs. Knight's first-authored work related to higher education appears in *Innovative Higher Education*, *Journal of Women and Minorities in Science and Engineering*, and *Science Education and Civic Engagement*. He has also presented papers at the American Society for Engineering Education (3 of these papers received Best Paper awards), Association for the Study of Higher Education, and American Educational Research Association.

Furthermore, Knight has international experience as a Postdoctoral Fellow in Engineering Education at the University of Queensland in Brisbane, Australia and was selected to manage an institutionally funded research project on student learning within Civil Engineering. He formed additional collaborations across Australia on projects related to learning analytics, the development of platforms to provide individualized feedback in large classes (analogous to the proposed project's packaging of data for individuals to promote positive change in behavior), and an empirical study of work-integrated learning opportunities for students. Knight's work has been presented at the Australasian Association for Engineering Education, and a manuscript is under review with the *European Journal of Engineering Education*.

For the proposed project, Knight will lead educational research efforts and will develop the theoretical foundation for the project by identifying consistencies in published literature, identifying and acquiring necessary databases, and will use his training in qualitative research methods to lead efforts to address the second research question. With professional experience in the administrative structure at the University of Virginia, Knight also has skills to navigate a complex organizational field and interact with multiple types of stakeholders within and outside the academic setting. As such, he will be responsible for developing relationships with institutions of higher learning for possible additional data collection.

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#### David Hondula's Biography Sketch

David M. Hondula is the Chief Financial Officer and Research Associate with Pavilion Research, a non-profit research organization focused on investigating practical solutions for real-world problems using data-driven analytical techniques. An important attribute of the research team is its interdisciplinarity, with each researcher bringing a unique set of experiences and competencies to this project, including education research, high-powered statistical analyses and modeling, computer programming, decision-support tools, and human-interface design. The team of investigators from Pavilion Research has developed a track record for collaborating to address important educational issues. The proposed idea has won accolades from a University of Virginia concept competition, and Pavilion's researchers were invited and received funding to attend the 2012 Keck Futures workshop, sponsored by the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The Pavilion Team also has tackled issues related to the financial stability of intercollegiate athletics departments and currently has a manuscript under review with the *Journal of Applied Business and Economics*. In late 2012 the team earned top honors in a social entrepreneurship competition for proposing a system to assist faculty members in delivering high-quality, rapid feedback to large lecture classes to promote student learning.

Hondula will have a doctorate in Environmental Sciences from the University of Virginia when the proposed project commences. Hondula also holds Bachelor's and Master's degrees from the University of Virginia in Environmental Sciences and has participated in several research projects in the area of environmental exposure and public health. His primary research examines geographic aspects of heat-related mortality in seven U.S. cities with the ultimate goals of (1) delivering maps to local emergency planners identifying high-risk zones within their service regions, and (2) using statistical models to understand the key factors associated with high risk. Along with David Knight (co-PI on this proposal), Hondula worked extensively on the NOAA-funded ShenAir Initiative, collaborating with researchers at the University of Virginia, Virginia Tech, and James Madison University. Hondula and Knight were directly responsible for components of the project related to time series analysis of hospital admissions related to respiratory distress. He has also investigated aspects of the large-scale climate, climate change, and the risks facing coastal communities related to major storms.

Throughout his academic career, Hondula has widely disseminated research findings in peer-reviewed journals. His first-author publications include articles in *Global Health Action*, *Environmental Health*, *International Journal of Biometeorology*, *Climate Research*, *Theoretical and Applied Climatology*, *Environmental Research Letters*, and *International Journal of Climatology*. In addition, he has presented related research at meetings of the Association of

American Geographers, International Society for Biometeorology, International Society for Environmental Epidemiology, and American Meteorological Society.

Hondula has also received funding from multiple competitive National Science Foundation programs for international collaborative research opportunities. He worked with leading statisticians in Umeå, Sweden and Brisbane, Australia to advance his skills related to time series analysis in the context of linking environmental variables to health outcomes. Hondula is continuing to explore spatial variability in hospital admissions related to extreme heat and cold in Brisbane. Hondula also was a Science to Achieve Results (STAR) Graduate Research Fellowship recipient from the Environmental Protection Agency, selected participant in the National Science Foundation Graduate Research Fellowship Program, Virginia Space Grant Consortium Fellowship recipient, and two-time invited participant at the Keck Futures Initiative Digital Information Conference sponsored by the National Academies of Science, Engineering, and Medicine.

For the proposed project, Hondula will use his extensive statistical expertise to develop a model of the multivariate trajectories of college applicants within Virginia, and a background in a non-education discipline will contribute new quantitative methods, ideas, and techniques for addressing a complex, multivariate problem. In addition, Hondula will lead the operations aspect of this project. He will develop relationships between our team and high school administrators and counselors for deploying the decision-support tool, a skill that he has developed throughout his collaborative research agenda.

#### Aaron Williams's Biography Sketch

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Aaron L. Williams is the Chief Technology Officer and Research Associate with Pavilion Research, a non-profit research organization focused on investigating practical solutions for real-world problems using data-driven analytical techniques. An important attribute of the research team is its interdisciplinarity, with each researcher bringing a unique set of experiences and competencies to this project, including education research, high-powered statistical analyses and modeling, computer programming, decision-support tools, and human-interface design. As described in the Bio Sketch for David Hondula, the team of investigators from Pavilion Research has developed a track record for collaborating to address important educational issues.

Williams will have a doctorate in Systems Engineering from the University of Virginia when the proposed project commences. His primary research focuses on possible interfaces between the human body and external systems. Most recently, he has been investigating how to transform the electrical potentials generated by artificial sensors into pulses of current that can communicate directly with the peripheral nervous system. Such an approach could restore or augment sensation in amputees or the otherwise injured. General research interests include neural engineering, somatosensory systems, haptics, cognitive systems engineering, and biomedical device design. As a part of this program of study, Williams' relative course work for the proposed project includes Linear Statistical Models, Mathematical Programming, Data Mining, Agent Based Modeling of Complex Systems, Dynamic Systems, Decision Analysis, Quantitative Models of Human Judgment, Modeling of Human Sensory Perception, and Simulation Optimization.

In addition, Williams holds a Master's degree in Biomedical Engineering (Biomechanics Concentration) and Bachelor's degree in Mechanical Engineering, both from the University of Michigan. In these programs, he was involved in several applied projects that helped develop his skills as a researcher. These include modeling and predicting stress responses in children on an international collaborative research team and building and testing an EEG anti-somnolence system capable of detecting changed in brain wave patterns. He also has modeled and designed several products for potential use by the general population, including an environmentally friendly driver seat, a sternal closure device, a foldable computer mouse, and a bus tracking system for the University of Michigan's bus fleet.

At the University of Virginia, Williams has been funded by a medical informatics training grant from the National Library of Medicine. In addition, he has contributed to grants sponsored by the NASA Virginia Space Grant

Consortium, Defense Advanced Research Projects Agency, and Army Research Office. He has published at the IEEE Engineering in Medicine and Biology Society Conference and presented at the NIH headquarters in Bethesda, MD. He is also an active participant in the area of human factors and machine interfaces, having provided peer review to the 2011 IEEE World Haptics Conference (Istanbul) and the 2012 IEEE Haptics Symposium (Vancouver).

For the proposed project, Williams' interest in finding ways to process large amounts of data into smaller, useful pieces of information will be a driving force. His expertise in informatics gives allows our team attempt to improve students' college preparedness by leveraging, delivering, and packaging available data in new ways. Williams' past experience building mathematical models and simulations to characterize complex multi-factor relationships will contribute to both research questions. Overall, he will spearhead technology development by designing, developing, and building the virtual decision-support platform. He will be responsible for database management, assist in constructing and validating numerical models, develop platform architecture, provide technical support, and manage content.

#### Budget Requirements

##### David Knight' Budget

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Personnel-Time on Project  
 %(FTE) Academic Year: 10.00  
 %(FTE) Summer: 20.00

Personnel-Salary & Benefits  
 Academic Year: \$ 50000.00  
 Summer: \$ 15000.00

##### David Hondula's Budget

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Personnel-Time on Project  
 %(FTE) Academic Year: 10.00  
 %(FTE) Summer: 20.00

Personnel-Salary & Benefits  
 Academic Year: \$ 50000.00  
 Summer: \$ 15000.00

##### Aaron Williams's Budget

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Personnel-Time on Project  
 %(FTE) Academic Year: 10.00  
 %(FTE) Summer: 20.00

Personnel-Salary & Benefits  
 Academic Year: \$ 50000.00  
 Summer: \$ 15000.00

##### Graduate Research Assistant's Budget

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Personnel-Time on Project



%(FTE) Academic Year: 25.00

%(FTE) Summer: 50.00

Personnel-Salary & Benefits

Academic Year: \$ 18000.00

Summer: \$ 6000.00

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Total Salary and Wages: \$31500.00

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Travel: \$2000.00

Other travel related expenses: \$3000.00

Other research expenses: \$3500.00

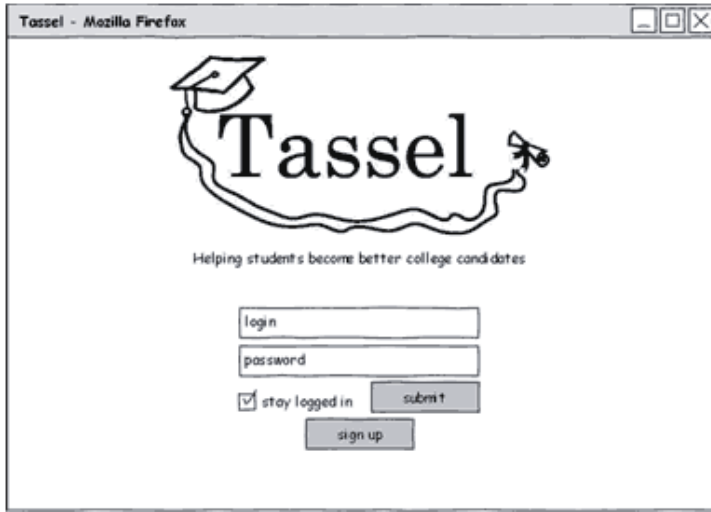
Total Request: \$40000.00

#### Funding History

THE GENERAL COLLEGE READINESS DECISION-SUPPORT CONCEPT PRESENTED IN THIS PROPOSAL HAS RECEIVED SOME PRIOR SUPPORT, BUT FUNDING HAS NOT YET BEEN OBTAINED FOR COMPLETING THE PROPOSED RESEARCH STUDY. IN 2011, THE IDEA WAS AWARDED \$2000 IN A CONCEPT COMPETITION AT THE UNIVERSITY OF VIRGINIA. IN NOVEMBER 2012, PAVILION RESEARCHERS WERE INVITED AND FINANCIALLY SUPPORTED TO ATTEND THE 10<sup>TH</sup> ANNUAL NATIONAL ACADEMIES KECK FUTURE INITIATIVES CONFERENCE IN IRVINE, CALIFORNIA. PROJECT RESEARCHERS WERE SELECTED TO ENGAGE IN THE WEEK-LONG DIALOGUE BASED ON THE IDEAS PRESENTED IN THIS RESEARCH PROPOSAL. THE CONFERENCE BROUGHT TOGETHER APPROXIMATELY 150 RESEARCHERS AND PROFESSIONALS TO TACKLE MAJOR CHALLENGE AREAS IDENTIFIED BY THE NATIONAL ACADEMY OF SCIENCES, THE NATIONAL ACADEMY OF ENGINEERING, AND THE INSTITUTE OF MEDICINE. OUR RESEARCH TEAM CURRENTLY HAS A RELATED, COMPLEMENTARY PROPOSAL UNDER REVIEW WITH THE SPENCER FOUNDATION. ALIGNED WITH THE SPENCER FOUNDATION'S GOALS, AN IN-DEPTH FOCUS IS PLACED ON ISSUES RELATED TO THE FIRST RESEARCH QUESTION FOR THAT PROPOSED PROJECT. SIMILARLY, ALIGNED WITH THE NPEC INTEREST IN DEVELOPING A GREATER UNDERSTANDING OF DATA USAGE, THE PRESENT PROPOSED AIR PROJECT GREATLY EXPANDS THE FOCUS ON AND METHODS FOR ADDRESSING THE SECOND RESEARCH QUESTION. COMPLETING THE PRESENT PROJECT AS PROPOSED WILL NOT BE AFFECTED BASED ON THE OUTCOME OF THE SPENCER FOUNDATION FUNDING PROPOSAL. NO MEMBER OF OUR RESEARCH TEAM HAS PREVIOUSLY RECEIVED FUNDING FROM THE ASSOCIATION FOR INSTITUTIONAL RESEARCH.

# Appendix 1. Sample Web-Based Interface

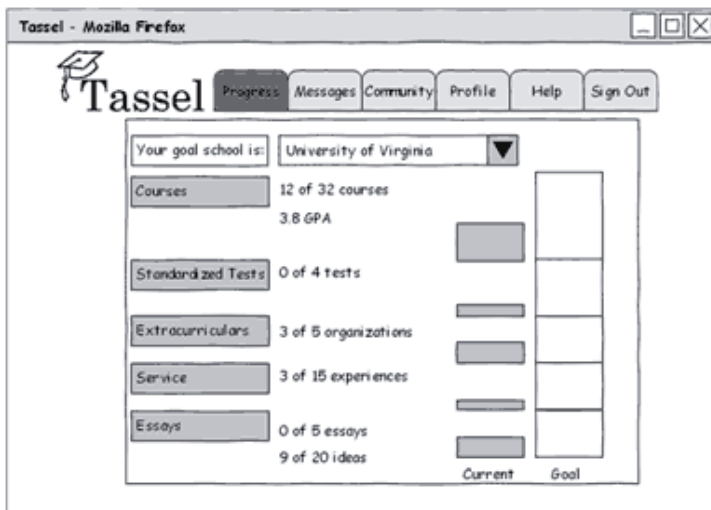
A



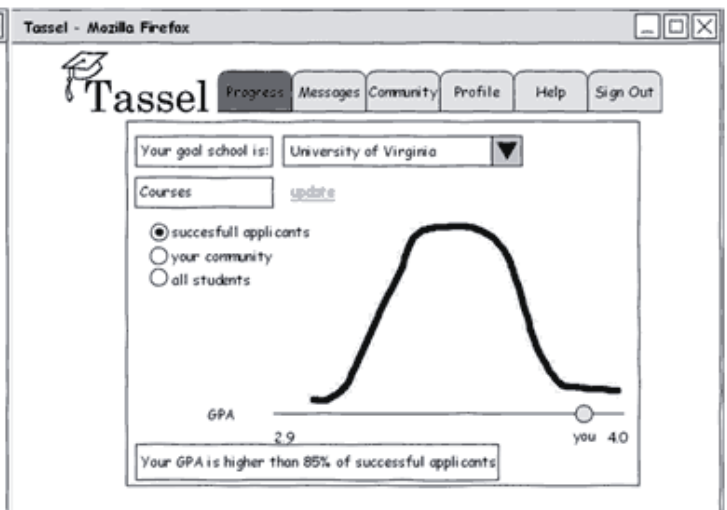
B



C



D



## Appendix 2. Sample Tailored Email Message

**KEY:** ■ Information from Student Profile ■ Information from Database

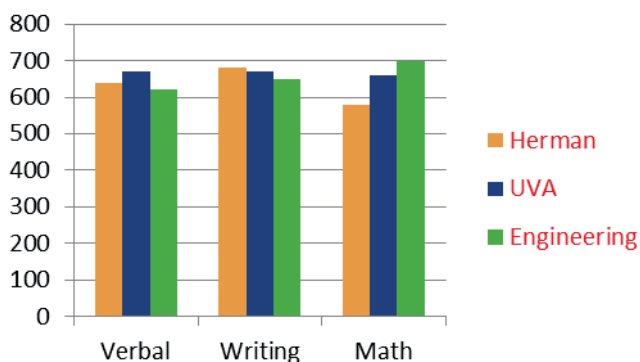
Dear **Herman**,

Congratulations on finishing your **Sophomore** year of high school! We are very happy that you have created a profile with Tassel because the sooner you begin the college preparation process, the more options you will have. As a member since **April** of your **Freshman** year, we are happy to see that you have taken some of our suggestions to position yourself well for the future. Now that you are at the **halfway point** of your high school career, here are some “**halftime adjustments**” that we suggest to help you become an even better candidate for colleges.

You’ve indicated that the **University of Virginia** is your first choice for college. Last year, **23** students from your district, the **Portsmouth City Schools**, were admitted by **UVa**, and these students had an average GPA of **3.8** and an average SAT score of **2000**. With a GPA of **3.9** through your **Sophomore** year, you are on the **right** track for this institution! Of all students admitted to **UVa** last year, the average GPA after the **Sophomore** year was **3.85**, so that is also **good news** for you.

You scored a **1900** on your **PSAT** this year and are thinking of majoring in **engineering**. This is a **competitive** score for **most** institutions, **but** we advise that you **work a bit more** on your **math** score:

- You scored **640** on the verbal section.  
The average **UVa** SAT verbal score is **670**.  
The average **engineering** verbal score is **620**.
- You scored **680** on the verbal section.  
The average **UVa** SAT verbal score is **670**.  
The average **engineering** verbal score is **650**.
- You scored **580** on the math section.  
The average **UVa** SAT math score is **660**.  
The average **engineering** math score is **700**.



Now let’s think about the courses that will be most important for **engineering**. You earned a **B+** in **Algebra II** and an **A** in **Chemistry** this year. Students admitted to **UVa** in **engineering** earned an **A** more than any other grade in **Algebra II** and **Chemistry**. We advise that you **consider a tutor** for **math** this **summer**. **UVa engineering** students typically took **AP Calculus** and **1 AP science** course by the time they graduated. The average successful **UVa** applicant took **4** AP courses when they were in high school. You may want to think about how you can plan your course schedule accordingly over the next **2** years.

You have participated in extra-curricular activities at an **above-average** rate compared to successful **UVa** applicants. **Soccer**, **student government**, **Key Club**, and **chorus** make an excellent list. Since you are going into your **Junior** year, you may want to think about **leadership positions**. **85%** of **UVa** applicants **held a leadership position** in high school. Also, your school and experience status updates have happened only **2** times in the past 3 months. Try to do this more often so we can help you generate ideas for essays when you begin writing your application for the **University of Virginia**.

Keep up the great work, **Herman**! Remember, the more you update your profile, the more we can help you make well-informed decisions for your future. Have a good **summer** and **Junior** year!

Helping YOU Become a Better College Candidate,

Your College Readiness Data Team