


# CS486C – Senior Capstone Design in Computer Science

## Project Description

<b>Project Title:</b> VCASS: A Tool for Assessing Alumni Success	
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### Project Overview

Verde Christian Academy (VCA) is a medium sized school (+/- 200 students) which has been serving the Verde Valley for 40 years. The focus during most of this time has been on primary grades K-5, with students then going on to other local private, charter or public schools for grades 6-8 (“Middle School”). VCA has earned and maintained a strong reputation for both student academics and “school citizenship” over this time, as reported by student parents and teachers, via informal networking that is probably typical of and made possible by the nature of a small community.

Currently, VCA is in the 2<sup>nd</sup> year of a 4 year plan to expand their offering to include primary grades 6-8; with 7<sup>th</sup> grade coming on line with the commencement of the 2020/2021 academic year. This expansion represents a “pull” from parents to continue their student’s education in a faith-based, small class-room environment that also emphasizes academic and social skills.

### The Challenge

With this new challenge comes the added responsibility of assuring that students embarking on their secondary (High School) education are equipped for success. This next phase in a student’s growth into an environment with greater demands academically and socially represents a significant step up for students, relative to that from the primary to middle school grades. Students entering secondary education are starting on the path of their eventual independent participation in citizenship and leadership.

Recognizing this challenge, VCA would like to put in place a customized software application designed to provide an ongoing assessment of student involvement and success during their high school years following graduation from VCA. More specifically, the software system would allow VCA students to create an account as they graduate, would let VCA staff create a library of “surveys” that can be regularly scheduled for distribution to targeted subgroups of alums, and would provide mechanisms for distribution of the surveys and collection of the data. It would also provide tools for analyzing the resulting responses in various ways (e.g. graphing averaged responses from a cohort) to expose interesting patterns. This will provide a basis for quality review of programs, identifying needed offerings and defining strengths and weakness to improve programs and best match student, parent and educator expectations. An eventual “stretch” version of this system could also provide a connection platform for VCA high school students to maintain contact with each other, seek advice and counsel from past teachers and staff, or even help with connections to tutoring resources.

### The Project: Details

As an initial proof of concept for this system, we envision a secure, authenticated web application which we will call the Verde Christian Academy for Student Success (VCASS) system. Functional details will be explored and elaborated by the team in the design phase, but will likely include the following core features:

#### Basic Features (minimum viable product)

- A secure user management that allows administrators, parents, and students to create accounts. This includes collection of consents.
- A robust profile management component in which a broad range of details about each student can be captured, with various elements editable by system admins and the user.
- A role-based user permissions system. Admins, staff, parents and users themselves may see quite different things and have differing privileges.
- Ability to send a survey from VCA to students electing to participate, and collect responses for later analysis. Major emphasis sections of the survey are anticipated to include:

- Academic. This will include interval/final grades, class descriptions
- Extra-curricular: Involvement in school related, beyond classroom activities such as sports, clubs, bands, student government, study groups
- Civic: Participation in activities outside of school such as community events, support organizations
- Faith: Participation in faith related activities including youth groups, service missions, music, Bible study groups
- Comments: Provides an opportunity for students to communicate observations and insights to the VCA Administrator
- Must be able to search/select students to send survey to based on criteria, e.g., all males, all students in a year, etc.
- Ability to view status of survey responses (how many received, percentage response, who responded or not).
- A way to export responses in some tabular form for further analysis

#### A complete VCASS system: well-appointed product that's truly usable

- Ability to create/edit any number of surveys, which are stored in some sort of library ready for deployment.
- Ability to set up "Survey events" on a timeline: Choose a survey to send, search/define a group of target recipients, schedule a send date, as well as a "closing" date. Ability to view all such "Survey events" on a timeline, edit and adjust them, and view/analyze data from any one event. Also could export data collected for any one of them.
- A graphical tool for analyzing survey results in VCASS. Can flexibly specify a cohort or range of cohorts (e.g. graduates in last 10 years), and view (bar graphs, pie charts, graphs) various aspects of the select datasets. Will allow the VCA program administrator to consolidate the survey results from various group and provide both group and individual (anonymity protected) profiles (i.e., individual vs group performance). Details to be worked out with team advice, and will be tailored to answer key learning and live achievement success of VCA graduates.
- A notification/reminder system: for a given "Survey event", can configure reminders (when, how often) to be sent out to target participants who have not responded, as well as notification to admins, e.g., when response rate reaches xx%.
- System must be designed from start to support multi-endpoint access. We are focusing here on a web app interface, but a future mobile app product will be integrated; system must be designed to make this simple and easy.
- An integrated "User's Manual" and notes system. Will provide required training for continually evolving team of VCA assigned program administrators (the user manual piece), as well as providing a means for users over the years to add "notes" to various sections to create a repository for learned experience about the tool over time. This latter will help refine the tool to keep it robust and relevant.

#### Above and beyond: potential "stretch goals" to explore

- Tutoring/Counseling Assistance: Ability for VCA students to request help in finding resources for specific tutoring or counseling help.
- Social Networking: Ability for VCA students to maintain contact with fellow VCA alums.

Any worthwhile venture deserves a method to measure success and identify shortcomings. VCA is making significant investments, and putting its longstanding reputation on the line, with an expansion to grades 6-8 in preparation for student success in high school. The school is growing, the community is growing, expectations are growing- reliance only on casual observations and anecdotal reports is useful but will not provide an accurate and consistent measure of how well VCA is serving their students. This project will provide the VCA Administrator with a foundation for developing and refining reliable, quantifiable performance measures; improve VCA's programs, and send a powerful statement about VCA's commitment to parents and students.

### **Knowledge, skills, expertise**

- Familiarity with modern web2.0 technologies, techniques, and frameworks.
- Creativity in thinking through approaches to identifying potentially useful measures of success in the high school experience, as well as product features that will make it attractive for VCA grads to engage with.
- Familiarity with backend database design and implementation. Must provide secure storage and rapid efficient access in viewing data.
- Familiarity with networked web application design.
- Strong written and verbal communication skills

### **Equipment Requirements**

- No expectation that equipment or software is required other than development platforms/software/tools freely available online.
- Purchase acquisition of special tools/software or licenses that might be identified throughout work progress work will be negotiated with the sponsor

## **Software and other Deliverables**

- The web application as described above, deployed on a web-connected platform of the sponsors choosing, and fully tested successfully with real data.
- A complete and clear System Administrator Manual for installing, configuring, and operating the software; this hardcopy document is different from the end-user focused the integrated User Manual outlined in the specs above.
- A strong as-built report detailing the design and implementation of the product in a complete, clear and professional manner. This document should provide a strong basis for future development of the product.
- Complete professionally-documented codebase, delivered both as a repository in GitHub, BitBucket, or some other version control repository; and as a physical archive on a USB drive
- Delivery of product that includes full live demo of all features.