Business Solution Technologies Web Developer Internship

Sponsor: Colin Yu and Kevin Costa
Sponsor Organization: Business Solutions Technology (BST)
Client: Hawaii Teachers Standard Board (HTSB)

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Information and Computer Sciences
Department - University of Hawai'i at Mānoa

Multi-factor Authentication (MFA)

Introduction

The HTSB web application required *enhanced security measures* to protect sensitive user data. The project aimed to implement a *MFA feature* to address these concerns.

Problem

The problem faced by the HTSB web application was the need for enhanced security measures to *protect sensitive user data* against security threats from bad actors. The primary objective was to *design and seamlessly integrate* an *effective MFA feature* into the existing HTSB web application without disrupting its current functionality.

Accomplishments

- *Successfully implemented* MFA backend and frontend, providing a functional feature
- *Developed* backend routes, controllers, and created/updated database models as required
- *Validated* MFA in a test environment for smooth HTSB integration

Challenges

- Unfamiliarity with the application codebase and understanding the underlying technology stack, which was mitigated by diligently *studying the application architecture* and familiarizing oneself with the relevant programming languages and frameworks
- Encountered a security vulnerability where savvy users could bypass the MFA screen by exploiting specific endpoints. Addressed the issue by *implementing middleware* to enforce MFA validation on every incoming request, *effectively preventing unauthorized access*

Business Solution Technologies (BST)

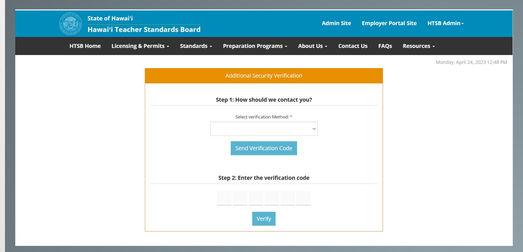
Hawai'i have trusted BST for their HR, technology, and business management consulting needs since 1996. Their *expertise and experience* in different industries enable them to provide *valuable insights* and guidance to their clients' goals.

BST & HTSB

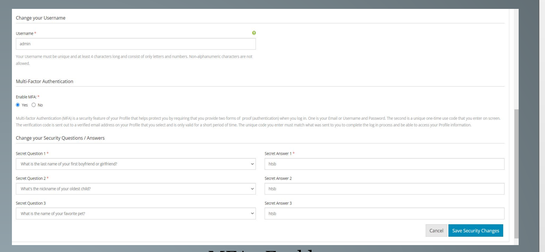
BST has created a new cloud-based *teacher licensing management system* for HTSB. This allows HTSB to *streamline* their licensing process, making it more *efficient and accessible* to to review license applications and provides reporting on the license status of teachers.

Hawai'i Teacher Standards Board (HTSB)

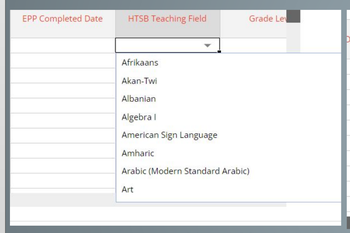
HTSB is the *official agency* for licensing educators in Hawai'i. They aim to *promote professionalism* and teaching excellence to ensure *qualified educators* are available to provide *quality education* to students.



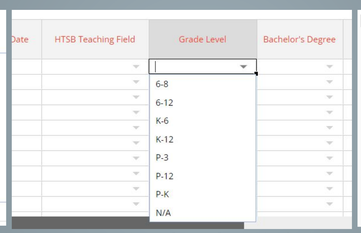
MFA - Verification



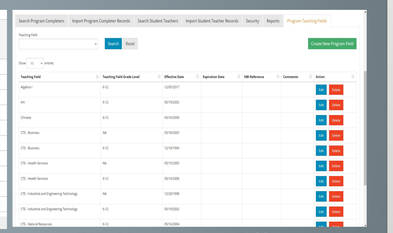
MFA - Enable



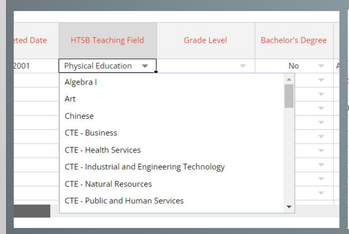
EPP - Generic HTSB Teaching Fields List (Before)



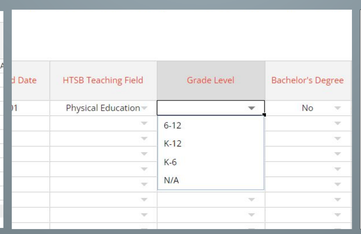
EPP - Generic Grade Levels List (Before)



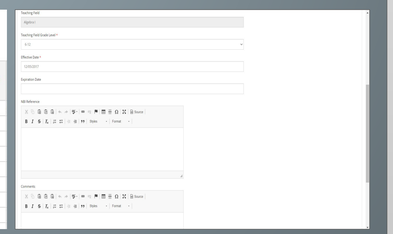
EPP - Manage Program Fields



EPP - Contextual HSTB Teaching Fields (After)



EPP - Contextual Grade Levels (After)



EPP - Edit Program Field

Project Management Approach

- Employed a hybrid approach of *Waterfall and Agile methodologies*
- Utilized Agile methodology for development by BST and short-iterative sprints and cross-functional teams, despite not fully adopting the Agile model for HTSB
- *Weekly meetings* with BST's technical director for accountability and progress update.

Technology Stack

- *PHP Slim Framework* for backend development
- *Twig*, *HTML*, *CSS*, and *JavaScript* for frontend development
- *MySQL* database and *PHP Eloquent* for ORM
- *PHPMailer* library for secure email handling

Learnings

- Technical: Gained proficiency in PHP Slim, Twig, DataTables, and Eloquent ORM, *expanding skill set and versatility*
- Soft: Strengthened *problem-solving* abilities, improved *teamwork* and *communication* skills, fostering a more collaborative work environment

Next Steps

- Conduct *extensive testing* of the updated application to *ensure stability and reliability*
- Upon completion of testing, the sponsor will push the code to the staging environment for further validation before deployment

Educator Preparation Program (EPP)

Introduction

The HTSB web application required an *enhanced EPP user feature* for them to select *program fields that are relevant* to their respective program.

Problem

Currently, the HTSB Institutions portal *relies on an EPP* (such as UH Mānoa, HPU, Chaminade, etc.) user to correctly select allowed values for a Teaching Field and Grade Level combination from lists. However, *some fields and grade levels may not be authorized for EPP* use which results in *erroneous data* being imported into the system if selected by the user. The solution would be to *limit the teaching field and grade level selections* that an EPP user can submit on the screen, contextual to each institution, to ensure that only authorized options are chosen. Implementing this new functionality will *resolve a complex problem* for the HTSB licensing management system.

Accomplishments

- *Created* a new database table to hold teaching field and grade level data by institution with effective date and expiration date capability
- *Implemented new UI screens* for HTSB staff and admins to manage an institution's program fields (view, create, edit, delete)
- *Implemented a dependent selection dropdown* to limit the HTSB Teaching Field and Grade Level values that relevant can be selected on the screen
- *Developed* backend routes, controllers, and created/updated database models as required
- *Validated* EPP feature in a test environment for smooth HTSB integration

Challenges

- Initially lacking familiarity with the application codebase and underlying technology stack, the challenge was overcome by dedicating time to *study the application architecture*, and becoming comfortable in the relevant programming languages and frameworks
- Process of *testing and validating* data, which often involved going *back and forth* between different stages of development to *ensure accuracy and consistency*. This *added time* to the web development process, *requiring careful attention to detail* to streamline the testing process and avoid errors