



Project Description

ENSE871: Usability Engineering
Pixels Odyssey

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Team Name

- Pixels Odyssey

Team Members

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Project Sponsor

- Dr. Tim Maciag (ENSE 871 Professor)

Business Needs & Opportunity

The "Humanities in Engineering" SIG has to deal with problems including misaligned interests, insufficient visibility, inefficient contact possibilities, and network mapping. These difficulties appear to be impeding the growth of cooperation and the recruitment of new participants in the engineering education community. As such, the development of a user-friendly, bilingual web platform is imperative. They will be able to efficiently communicate with possible partners, highlight events, and convey their research interests thanks to this. In details,

1. **Promote Seamless Collaboration:** This platform's main objective is to offer an approachable setting that promotes smooth cooperation across SIG members. Our goal is to create a dynamic and active community by optimizing communication and project cooperation through the integration of cutting-edge collaborative tools.
2. **Knowledge Sharing using Maps:** The platform will allow users to visually display and share their knowledge by utilizing the power of maps. In addition to improving the educational process overall, this special feature will make the field more dynamic and participatory, allowing members to explore a wider range of viewpoints.
3. **Increase Group Visibility:** The "Humanities in Engineering" SIG will be much more visible as a result of the addition of member profiles and modifiable areas of interest. Members will be able to display their knowledge thanks to this feature, which will promote a sense of solidarity and community pride.
4. **Possibilities for Networking:** The platform will provide SIG members with specific networking opportunities because it understands the value of networking. Building strong

professional ties and a strong support system is the aim, whether accomplished through discussion boards, in-person gatherings, or targeted interactions.

5. **Multi-Language Support:** One of the main goals is to make sure that the online platform can support the various linguistic preferences of SIG members by putting in place a strong multi-language support system. This feature will improve the "Humanities in Engineering" SIG's accessibility, inclusion, and involvement while cultivating a genuinely global community.
6. **Simple and Low maintenance:** Creating a platform that is easy to use and requires little upkeep is a major goal of the project. Through an emphasis on design and functionality simplicity, the platform seeks to lessen the administrative load, freeing up SIG members to concentrate on information sharing and cooperation instead of technological intricacies.

Reflections on Project Planning, Execution & Closing

North Star & Carryover Customers

North Star Customer:

The primary target audience for this initiative are the members of the relevant Special Interest Group (SIG). These individuals are engineering educators and practitioners who are actively engaged in the discussions, research, and activities of the SIG. As the core constituency, the SIG members represent the "North Star" customers whose needs and interests should guide the development and delivery of the project's offerings.

Carryover Customer:

In addition to the SIG members, the project should also consider two other categories of potential customers:

Engineering Educators and Practitioners Not Actively Involved in the SIG

This group includes engineering educators and practitioners who are not currently active members of the SIG but may find value in engaging with the SIG's discussions, research, and resources. While not the primary target audience, these individuals represent an important secondary customer segment that could benefit from and contribute to the project's initiatives.

Students or Professionals from Related Fields

The project should also consider students or professionals from fields related to engineering education, such as education, psychology, or instructional design. These individuals may be interested in the interdisciplinary approaches and insights that the SIG can provide, and their participation could foster valuable cross-pollination of ideas and practices.

By clearly defining the North Star customers (SIG members) and the carryover customer segments, the project can ensure that its activities, content, and delivery mechanisms are tailored to meet the diverse needs and interests of the target audience, ultimately enhancing the project's impact and reach within the engineering education community.

Project Assumptions

- Stories On Board (Affinity Diagram)
- WordPress (Website Designing)
- Github (File Hosting and Team Collaboration)
- Figma (UI Design)

- Github Project Board (Tracking the work in progress)

Project Constraints

- Limited WordPress Functionality

Key Findings from the Empathy Map

- Desire for an easy-to-maintain, user-friendly website that facilitates effective communication and collaboration among SIG members.
- Need for a platform that can promote deeper knowledge and wisdom within the engineering education community.
- Requirement for enhanced visibility of the SIG's activities and initiatives at the local, national, and global levels.
- Importance of a bilingual and accessible platform to cater to a diverse audience.
- Enthusiasm for networking and relationship-building opportunities within the SIG.
- Motivation to engage in the development process and provide collaborative feedback.

Key Findings from the Affinity Diagram

- Comprehensive user management features, including sign-up/sign-in, profile creation, updates, and deletion.
- Advanced research paper discovery capabilities, such as basic search, browsing by tags, authors, and publication dates.
- Robust community engagement functionalities, including group creation, exploration, joining, and content sharing.
- Ability to connect with other interested users and SIG members, fostering networking and collaboration.
- Event management features, enabling the creation, registration, and archiving of relevant activities and gatherings.
- Centralized platform for accessing and interacting with the SIG's resources, content, and community.

Initial MVP and Evolution of USM

Initial USM

The initial MVP (Minimum Viable Product) of the USM focused on delivering the core user authentication and profile management functionality, including:

- **Sign In / Sign Up:** Allowing users to create an account and securely access the system.
- **Create Profile:** Enabling users to set up their personal profiles.

- **See Profile:** Allowing users to view their own profile information.
- **Update Profile:** Giving users the ability to modify their profile details.

This initial scope was strategically chosen to validate core user needs, minimize development effort, and collect real-world data.

First Client Meeting

After the initial MVP release, the team met with the client for the first time. Based on the client's feedback, the team made the following changes to the USM:

- **Removed Community Page:** The client decided that the community features were not a priority for the initial release.
- **Removed Events Page:** The client also determined that the events functionality was not required at this stage.
- **Removed Approve Papers Page:** The client felt that the paper approval process was not a core part of the MVP.

These changes allowed the team to focus on the most critical features and deliver a more streamlined product.

Second Client Meeting

During the second client meeting, the team went down a path of development that did not align with the client's actual requirements. This resulted in the team building pages and features that the client did not want or need.

Re-evaluating and Getting Back on Track

After realizing the team had strayed from the client's true needs, the following steps were taken to get the project back on the right path:

- **Re-engage with the Client:** The team scheduled an additional client meeting to thoroughly re-evaluate the requirements and ensure a shared understanding of the project's goals and priorities.
- **Conduct a Comprehensive Review:** The team reviewed the existing USM and development work to identify the areas that were misaligned with the client's needs.
- **Prioritize Client Feedback:** The team actively listened to the client's feedback and used it to inform a revised USM and development roadmap.
- **Adjust the Development Approach:** Based on the client's input, the team adjusted their development approach to focus on the features and functionality that were truly valuable to the client and end-users.

Third Client Meeting

After the re-evaluation process, the team met with the client for the third time. During this meeting, the team and the client agreed to merge the Dashboard and About Pages into a single "Landing Page" to provide a more cohesive user experience.

Revised Release Order

The team decided to release the features in the following order:

- **User Profile Pages:** This included the sign-in/sign-up, create profile, view profile, and update profile functionality.
- **SIG Members Pages:** The team then focused on delivering the pages related to exploring and viewing SIG (Special Interest Group) members.
- **Research Paper Pages:** Finally, the team implemented the pages for finding, selecting, and suggesting research papers.

This release strategy allowed the team to prioritize core functionality, gather feedback iteratively, and manage complexity.

Prototyping Activities and Usability Evaluation Findings

Our prototyping activities involved creating initial designs for our website using high-fidelity prototypes. These designs were then refined based on usability testing and feedback gathered from both our client and peers. During usability evaluations, participants interacted with prototypes of our website, providing feedback on their experience, ease of navigation, and overall satisfaction with the design. Prioritized release of User Profile Pages, SIG Members Pages, and Research Paper Pages to manage complexity and gather feedback iteratively.

Linking Design Ideas to People-Centered Design Topics:

1. Affordances:

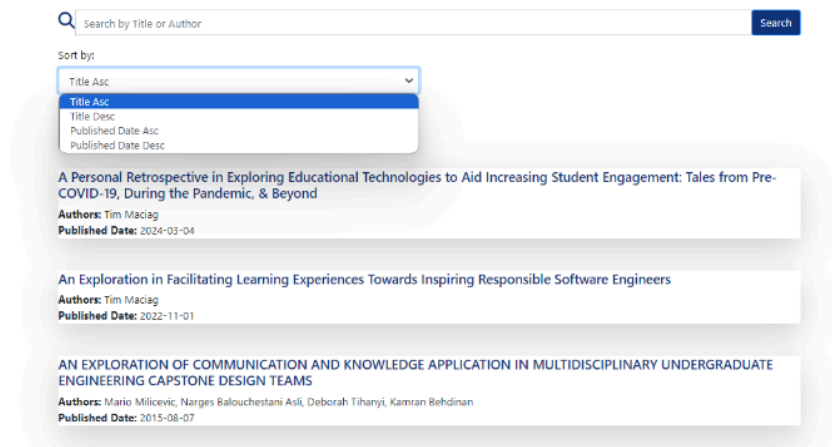
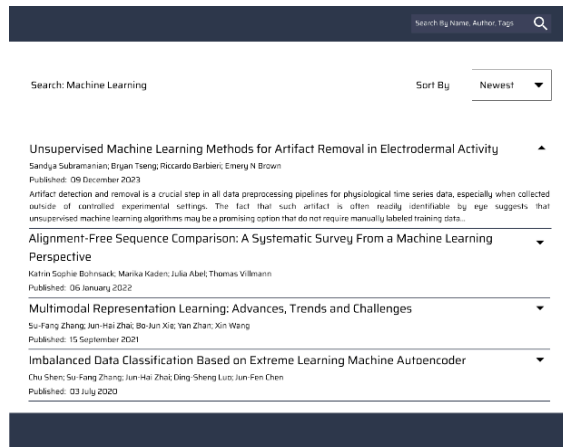
- **Design Buttons:** Buttons were designed with a contrasting color (dark blue) to their background, indicating their interactive nature and encouraging users to click.
- **Form Fields:** Placeholder text within input fields suggests the expected action when clicked, while dropdown lists visually convey their toggleable nature, aiding user selection. For instance, dropdown lists were used to sort research papers by author and date, as well as to switch languages.
- **Navigation Elements:** Underlined text for hyperlinks in the research paper section indicates clickable links, facilitating navigation.

2. Gestalt Principles:

- **Proximity:** Grouping related items together, such as research interests in the user profile section, aids user selection by implying their relationship.
- **Similarity:** Consistent colors, fonts, and styles for elements like headings and buttons indicate their association. Grouping items with similar shapes or icons, such as in pie charts and graphs for trending research interests and publication trends, helps users understand their relationship.

3. Constraints:

- **Form Validation:** Disabling the "save changes" button until all required form fields are filled out prevents users from submitting incomplete information, ensuring data accuracy. Error messages guide users towards correcting mistakes.
- **Navigation Constraints:** Hiding menu options or features not applicable based on user roles or permissions streamlines the user experience, preventing confusion.



Wordpress Solution

The final WordPress solution is a comprehensive and user-centric platform that addresses the specific requirements of the client's SIG. The solution features a visually captivating theme, dynamic content presentation, streamlined user interactions, personalized user profiles, and responsive design. Additionally, the solution incorporates advanced search and filtering capabilities, as well as integration with scraping technology to gather relevant research papers from the CEEA source.

Notably, the team adopted a distinct coding strategy, leveraging PHP to craft a bespoke solution from the ground up, rather than relying heavily on plugins. This approach allowed the team to maintain full control over the development process, ensuring tailored functionality, seamless integration, and optimal performance. The custom theme also offers unparalleled flexibility, enabling easy customization and adaptation to the evolving needs of the SIG community. The development process, characterized by prototyping, feedback incorporation, and a custom coding approach, has resulted in a WordPress solution that not only meets but exceeds the expectations of the client and the end-users. This holistic, user-centric approach to development has positioned the final solution as a robust and adaptable platform that can effectively serve the needs of the SIG community.

Reflection on Project Results

1. Summarize how you felt about this project (likes/dislikes)

Dealing with clients and receiving feedback has been a beneficial learning experience, providing insight into real-world industry practices. However, we have encountered frustrations when clients request dynamic websites using WordPress, a platform primarily suited for static sites. This imposes limitations and constraints that hinder flexibility. A more suitable technological stack, like MERN, would offer better solutions. Overall, working on this project has been invaluable, offering hands-on experience, opportunities for skill application, and enjoyable collaboration with team members. Despite challenges such as tight deadlines and competing priorities, we have found the experience enriching and educational.

2. Summarize what went well during the project.

Overall, the project proceeded smoothly, marked by successful delivery of prototypes that were well-received by the client. Throughout development, we diligently transformed these prototypes into WordPress reality, guided by continuous client feedback that kept us on track. Key contributors to our success included strong communication and collaboration within our team, facilitated by regular meetings and a diverse range of skill sets. This collaborative spirit fostered creativity and innovation, allowing us to effectively tackle project challenges. Additionally, our thorough research and planning at the project's outset provided a clear roadmap, laying a solid foundation for our endeavors and enhancing our ability to overcome obstacles.

3. Summarize what did not go well during the project.

Despite the overall success of the project, we encountered challenges during the WordPress development phase due to a misunderstanding of the client's initial requirements, leading us to deviate from the intended path and focus on unnecessary aspects. Additionally, technical challenges arose during the implementation phase, taking longer than expected to resolve. While these hurdles tested our resilience and problem-solving abilities, they also underscored the need for improvements in project management and planning.

4. How successful was your team in translating prototypes into WordPress reality?

Translating Figma prototypes into WordPress posed a significant challenge due to the differences in design control and functionality between the two platforms. Figma offers extensive design capabilities, allowing for more intricate page designs. Conversely, WordPress imposes limitations on website development. To address this, we carefully considered WordPress limitations while creating our Figma designs, making the transition to WordPress smoother for our team. By aligning our Figma designs with WordPress capabilities, we found it manageable and efficient to convert prototypes into WordPress reality.

5. Did the people-center design ideas discussed in lectures help/hinder your design explorations?

The concept of people-centered design emphasizes understanding the needs, preferences, and behaviors of users throughout the design process. By focusing on the end-users, designers can create products and experiences that are intuitive, functional, and satisfying. In our case,

integrating these ideas into our design explorations helped us prioritize user experience and consider how our designs would resonate with the target audience. For example, we applied principles such as user research, usability testing, and empathy mapping to gain a deeper understanding of user needs and preferences. This approach informed our design decisions, ensuring that our prototypes and web pages were user-friendly, accessible, and aligned with the expectations of our audience.

6. What would you do the same for future projects?

The client meetings and ongoing feedback proved immensely beneficial, shaping our approach to future projects. Additionally, the structured development process we undertook, from initial affinity diagramming to crafting low and high-fidelity prototypes and ultimately refining the actual design, provided clear direction, and yielded positive outcomes.

7. What would you do differently on future projects?

For future projects involving dynamic data handling, we recognize the limitations of WordPress, which is primarily suited for static website development. Moving forward, we aim to leverage more suitable technologies that offer greater control and flexibility, with fewer constraints. One such example is the MERN stack, which provides a comprehensive solution for developing dynamic web applications.

8. Summarize opportunities and design ideas for future work.

Opportunities for future work lie in further refining client communication and feedback processes, as these proved invaluable in guiding project development. Embracing structured development steps, from affinity diagramming to prototyping and design, offers a solid framework for success. However, exploring alternative technologies beyond WordPress, particularly for projects requiring dynamic data handling, presents an avenue for innovation and improved efficiency. Transitioning to more suitable technology stacks like MERN can empower the team with greater control and flexibility, thereby enhancing the quality and scope of future projects.

Appendix

Theme

- **Theme Name:** Special Interest Groups
- **Version:** 1.0
- **Last Updated:** April 5, 2024
- **Functionality:** The Special Interest Groups theme is tailored specifically to meet the design and functionality requirements of the website. It includes unique layouts, styles, and features designed to enhance the user experience.

Plugins

Plugin Name: Polylang

- **version:**3.6.1
- **User Rating:** 4.5 stars (From 2607 users)
- **Last Updated:** March 20, 2024
- **Active Installations:** 700,000+
- **Functionality:** Polylang is a popular WordPress plugin for creating multilingual websites. It allows you to create bilingual or multilingual websites with ease, providing support for translating posts, pages, custom post types, categories, tags, and more. Polylang also offers customizable language switchers and integration with popular translation services.

Plugin Name: All-in-One WP Migration

- **Version:**7.81
- **User Rating:** 4.5 stars (From 7,367users)
- **Last Updated:** March 12, 2024
- **Active Installations:** 700,000+
- **Functionality:** All-in-One WP Migration is a powerful plugin for migrating WordPress websites. It allows you to export your entire WordPress site, including the database, media files, plugins, themes, and more, into a single file. You can then import this file into another WordPress installation, making it easy to move your site between hosts or domains. The plugin supports large site migrations, bypassing the upload size restrictions imposed by web hosts.

Custom Code

Function.php

```
<?php
```

```
// Call the scraping function once when the theme is activated
// scrape_and_insert_data();

function university_files() {

    wp_enqueue_script( 'bootstrap-js',
    'https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/js/bootstrap.min.js',
    array('jquery'), '4.5.2', true );

    // Enqueue Select2 JavaScript
    wp_enqueue_script( 'select2-js',
    'https://cdn.jsdelivr.net/npm/select2@4.1.0-rc.0/dist/js/select2.min.js',
    array('jquery'), '4.1.0-rc.0', true );

    if (is_page_template( 'page-profile.php' ) ) {
        wp_enqueue_script( 'profile-js',
        get_theme_file_uri('/static/script-profile.js'), array('jquery'), '1.0',
        true );
    }
    if (is_page_template( 'page-members.php' ) ) {
        wp_enqueue_script( 'members-js',
        get_theme_file_uri('/static/script-members.js'), array('jquery'), '1.0',
        true );
    }
    if (is_page_template( 'page-member-profile.php' ) ) {
        wp_enqueue_script( 'member-profile-js',
        get_theme_file_uri('/static/script-member-profile.js'), array('jquery'),
        '1.0', true );
    }
}
```

```

    }

    wp_enqueue_style('css_styles', get_theme_file_uri('/static/style.css'));
    wp_enqueue_style( 'bootstrap-css',
'https://maxcdn.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css',
array(), '4.5.2', 'all' );
    wp_enqueue_style( 'font-awesome-css',
'https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.5.0/css/all.min.css'
, array(), '6.5.0', 'all' );
    wp_enqueue_style( 'select2-css',
'https://cdn.jsdelivr.net/npm/select2@4.1.0-rc.0/dist/css/select2.min.css',
array(), '4.1.0', 'all' );

}

add_action('wp_enqueue_scripts', 'university_files');

function special_interest_groups_3_load_textdomain() {
    load_theme_textdomain( 'special-interest-groups-3',
get_template_directory() . '/languages' );
}
add_action( 'after_setup_theme',
'special_interest_groups_3_load_textdomain' );

// Register custom API endpoint to retrieve users with metadata
function custom_get_users_with_metadata() {
    register_rest_route( 'custom/v1', '/users', array(
        'methods' => 'GET',
        'callback' => 'get_users_with_metadata_callback',
    ));
}
add_action( 'rest_api_init', 'custom_get_users_with_metadata' );

// Callback function to retrieve users with metadata
function get_users_with_metadata_callback( $request ) {
    // Get all users
    $users = get_users();
    $formatted_users = array();
    foreach ( $users as $user ) {
        // Get user metadata
        $user_meta = get_user_meta( $user->ID );
        // $banner_image_id = get_user_meta($user->ID, 'banner_image_id',

```

```

true);
    $banner_image_id = isset( $user_meta['profile_image_id'] ) ?
$user_meta['profile_image_id'][0] : '';
    $banner_image_url = "" ;
    $research_interests = isset( $user_meta['research_interests'] ) ?
$user_meta['research_interests'][0] : '';
    $first_name = isset( $user_meta['first_name'] ) ?
$user_meta['first_name'][0] : '';
    $last_name = isset( $user_meta['last_name'] ) ?
$user_meta['last_name'][0] : '';
    // echo $banner_image_id ;
    if (!empty($banner_image_id)) {
        $banner_image_url =
wp_get_attachment_image_url($banner_image_id, 'full');
    }

    // Add user data and metadata to the formatted array
    $formatted_users[] = array(
        'url' => site_url('/member-profile'). '?user_id='. $user->ID,
        'search_url' => site_url('/members'),
        'banner_image_id' => $banner_image_id,
        'banner_image_url' => $banner_image_url,
        'research_interests' => $research_interests,
        'name' => $first_name . " " . $last_name
    );
}

// Return formatted user data with metadata
return rest_ensure_response( $formatted_users );
}

function custom_get_research_interests() {
    register_rest_route( 'custom/v1', '/research-interests', array(
        'methods' => 'GET',
        'callback' => 'get_research_interests_callback',
    ));
}
add_action( 'rest_api_init', 'custom_get_research_interests' );
function get_research_interests_callback( $request ) {
    // Get all users
    $users = get_users();

    // Array to store research interests and their counts

```

```

    $research_interests_counts = array();

    // Loop through each user
    foreach ( $users as $user ) {
        // Get user research interests
        $research_interests = get_user_meta( $user->ID, 'research_interests',
true );

        // Skip if research interests are empty
        if ( empty( $research_interests ) ) {
            continue;
        }

        // Split research interests into an array
        $interests_array = explode( ',', $research_interests );

        // Count occurrences of each research interest
        foreach ( $interests_array as $interest ) {
            if ( isset( $research_interests_counts[ $interest ] ) ) {
                $research_interests_counts[ $interest ]++;
            } else {
                $research_interests_counts[ $interest ] = 1;
            }
        }
    }

    // Format the results
    $formatted_results = array();
    foreach ( $research_interests_counts as $interest => $count ) {
        $formatted_results[] = array(
            'research_interest' => $interest,
            'count' => intval( $count ),
        );
    }

    // Return formatted research interests with counts
    return rest_ensure_response( $formatted_results );
}

function custom_get_research_papers() {
    register_rest_route( 'custom/v1', '/research-papers', array(

```



```

        'methods' => 'GET',
        'callback' => 'get_research_papers_callback',
    ));
}
add_action( 'rest_api_init', 'custom_get_research_papers' );
function get_research_papers_callback( $request ) {
    // Get all users
    global $wpdb;
    $papers = $wpdb->get_results(
        $wpdb->prepare(
            "SELECT * FROM {$wpdb->prefix}custom_articles"
        )
    );

    // Return formatted research interests with counts
    return rest_ensure_response( $papers );
}
// Function to handle form submission
function handle_profile_form_submission() {
    if (isset($_POST['submit'])) {

        require_once ABSPATH . 'wp-admin/includes/image.php';
        require_once ABSPATH . 'wp-admin/includes/file.php';
        require_once ABSPATH . 'wp-admin/includes/media.php';
        $user_id = get_current_user_id();
        $user_info = get_userdata($user_id);

        // Sanitize and validate form inputs
        $first_name = sanitize_text_field($_POST['first_name']);
        $last_name = sanitize_text_field($_POST['last_name']);
        $email = sanitize_email($_POST['email']);
        $institute = sanitize_text_field($_POST['institute']) ;
        $position = sanitize_text_field($_POST['position']) ;
        $bio = sanitize_textarea_field($_POST['bio']);
        $city = sanitize_text_field($_POST['city']);
        $research_interests =
        sanitize_textarea_field($_POST['research_interests']);
        $social_media = esc_url_raw($_POST['social_media']);

        // Update user profile
        $update_args = array(
            'ID' => $user_id,
            'first_name' => $first_name,

```

```

        'last_name' => $last_name,
        'user_email' => $email,
    );

    wp_update_user($update_args);

    // Update additional user meta fields
    update_user_meta($user_id, 'research_interests',
$research_interests);
    update_user_meta($user_id, 'social_media', $social_media);
    update_user_meta($user_id, 'city', $city);
    update_user_meta($user_id, 'institute', $institute);
    update_user_meta($user_id, 'position', $position);
    update_user_meta($user_id, 'bio', $bio);

    if (!empty($_FILES['profile_image']['name'])) {
        $profile_image_id = media_handle_upload('profile_image', $user_id);
        if (!is_wp_error($profile_image_id)) {
            update_user_meta($user_id, 'profile_image_id',
$profile_image_id);
        } else {
            // Handle error
        }
    }

    // Redirect to refresh the page after submission
    wp_redirect($_SERVER['REQUEST_URI']);
    exit;
}
}
add_action('init', 'handle_profile_form_submission');

```

?>

- **Installation:** The custom code is added to the theme's functions.php file. It includes User Management functionalities, APIs to ensure seamless integration with external systems or services , imports for CSS files for styling as well as JavaScript code for dynamic web handling
- **Usage:** The code can be modified to add/edit more functionalities according to user needs. For example, the CSS imports can be expanded to include more styling options

or customize the design according to specific requirements. Additionally, the JavaScript code can be enhanced to include more dynamic interactions or to integrate with third-party APIs for extended functionality.

- **Maintenance:** The code should be periodically reviewed and updated to ensure compatibility with the latest WordPress updates. Regular testing is recommended to verify its accuracy and effectiveness.
- **Potential Bugs:** As with any custom code, potential bugs may arise from conflicts with other plugins or theme updates. Thorough testing and monitoring are essential to identify and resolve any issues promptly.

Web-Scraping

```
<?php
/*
Template Name: Manual Scrape Template
*/
?>

<?php get_header(); ?>

<?php

function scrape_and_insert_data() {
    global $wpdb;
    $table_name = $wpdb->prefix . 'custom_articles';
    $users = get_users();
    foreach ( $users as $user ) {
        // URL of the page to scrape

        $user_meta = get_user_meta( $user->ID );
        $first_name = isset( $user_meta['first_name'] ) ?
$user_meta['first_name'][0] : '';
        $last_name = isset( $user_meta['last_name'] ) ?
$user_meta['last_name'][0] : '';

        // $url =
'https://ojs.library.queensu.ca/index.php/PCEEA/search/index?query=&dateFromYear=&dateFromMonth=&dateFromDay=&dateToYear=&dateToMonth=&dateToDay=&authors=Chantal+Rodier';
        $url =
```

```

'https://ojs.library.queensu.ca/index.php/PCEEA/search/index?query=&dateFromYear=&dateFromMonth=&dateFromDay=&dateToYear=&dateToMonth=&dateToDay=&authors='.$first_name . "%20" . $last_name;

    // Fetch HTML content
    $html_content = file_get_contents($url);

    // Parse HTML content to extract desired data
    $dom = new DOMDocument();
    @$dom->loadHTML($html_content);

    // Create a new XPath instance
    $xpath = new DOMXPath($dom);

    // Select all <li> elements within <ul> elements with class
    "search_results"
    $articles = $xpath->query("//ul[contains(@class,
'search_results')]/li");

    foreach ($articles as $article) {
        $title = $xpath->evaluate("string(../h3[@class='title']/a)",
$article);
        $article_id =
$article->getElementsByTagName('a')->item(0)->getAttribute('id');
        $article_url =
$article->getElementsByTagName('a')->item(0)->getAttribute('href');
        $user_id = $user->ID ;
        // Extract authors' names
        $authors_div = $xpath->query("../div[@class='authors']",
$article);
        $authors_text = "";
        foreach ($authors_div as $author_div) {
            $authors_text .= $author_div->textContent . ", ";
        }
        // Remove the trailing comma and whitespace
        $authors_text = trim($authors_text, ", \t\n");
        $authors_text = preg_replace('/\s+/', ' ', $authors_text);
        $title = trim($title, ", \t\n");
        $title = preg_replace('/\s+/', ' ', $title);

        $published =
$xpath->evaluate("string(../div[@class='published'])", $article);

```

```

        // Check if article_id already exists in the database
        $existing_article = $wpdb->get_row(
            $wpdb->prepare("SELECT * FROM $table_name WHERE article_id
= %s and author_id = %d", $article_id, $user_id)
        );

        // Insert data into custom table only if article_id doesn't
        already exist
        if (!$existing_article) {
            $wpdb->insert($table_name, array(
                'article_id' => $article_id,
                'article_url' => $article_url,
                'author' => $authors_text,
                'title' => $title,
                'author_id' => $user_id,
                'published_date' => $published
            ));
        }
    }

}

}

}

?>
<div id="primary" class="content-area">
    <main id="main" class="site-main" role="main">
        <div class="container text-center my-5">
            <br>
            <br>
            <h1>Manual Scraping</h1>

            <form method="post">
                <input type="hidden" name="scrape_data" value="true">
                <!-- <button type="submit">Scrape Research Papers</button> -->
                <button type="submit" id="login" class="btn btn-primary btn-block
my-5">Scrape Research Papers</button>
            </form>

            <?php
            if (isset($_POST['scrape_data']) && $_POST['scrape_data'] === 'true') {
                // Call the scraping function
                scrape_and_insert_data();
            }
        }
    }
}

```

```

        echo '<p>Data scraped successfully!</p>';
    }
    ?>
</div>
</main><!-- #main -->
</div><!-- #primary -->

<?php get_footer(); ?>

```

- **Installation:** The custom php code file is added to theme(i.e) web-scrping.php. It includes the logic to scrape the users' research papers from external sources like CEEA-ACEG website.
- **Usage:** The code can be modified to add more external sources for scraping thus enhancing the comprehensive repository of research papers.
- **Maintenance:** The code should be periodically reviewed and updated to ensure compatibility with the latest WordPress updates. The logic for web scraping should be updated according to the changes made in external sources.
- **Potential Bugs:** As with any custom code, potential bugs may arise from conflicts with other plugins or theme updates. Thorough testing and monitoring are essential to identify and resolve any issues promptly.

Custom Templates

- **Installation:** custom.php files are added to the themes' folder. It includes the templates for the web pages like homePage, members page and more.
- **Usage:** the files can be modified to make changes to the web pages, therefore enhancing the user experience.
- **Maintenance:** The code should be periodically reviewed and updated to ensure compatibility with the latest WordPress updates.