Wellesley Asks Nico: Designing A Q&A-Based Social Platform with Artificial Intelligence

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Abstract
This paper presents design processes as well as findings on the platform Wellesley Asks Nico, created for Wellesley College students to streamline questions to ask to their peers as well as an AI bot, Nico, implemented in the site. The site includes a main feed in which students can view all questions asked by others as well as a space to submit their own questions. Notably, our site uses a tagging system which allows students to filter questions, ensuring ease of finding topics of importance and minimizing overcrowding of similar questions. We summarize data from 20 class evaluation forms to find that the majority of students see our platform as a useful alternative to pre-existing methods students may use to discover the information they are seeking.

Introduction
Social computing refers to the study, design, and implementation of computational systems that facilitates social interactions and collaboration among individuals or groups. It encompasses technologies like social media, online communities, and most recently artificial intelligence (AI). In the hopes of creating an online space where Wellesley students can freely ask questions and exchange information about student and academic life, we chose to implement an asynchronous Q&A-based social platform.

The concept for our website was inspired by the Wellesley FAQ Facebook Group created by Wellesley students, where students who are part of the Wellesley community are able to ask questions to fellow classmates and alums. However, we also brainstormed

several unique features to make our platform more intuitive and useful, including a tagging system and an AI response generator, which we have dubbed as Nico. Feedback collected from two rounds of user testing and evaluation suggests that there exists interest among the student population for such platforms for browsing and interacting with frequently asked questions. Testers expressed a general appreciation for the ease of navigation and the tag filtering system, although some improvements, such as the implementation of a search function and direct messaging to facilitate stronger social ties, could still be made.

Background Research

Our research for the project primarily focused on literature related to social media, artificial intelligence, and usage of both of these facets by college-aged students. Numerous studies have found that social media usage amongst college students is intensely related to their performance academically [1]. We thought that creating this site that gave students means to connect and share their academic experiences with each other would increase productivity and academic performance as a result of more comfort in peer relationships.

Furthermore, past research indicates that informal learning is pivotal to a college career, and studies have found that informal, unstructured learning can be just as important to overall learning as what happens in the classroom [8]. These findings were very important to us because our platform should be used as a method of informal learning by students, and knowing how popular and frequent the use of this type of platform gives us a motivation in which we build our site.

We also think our site should provide a catalyst for students to connect with other students that they relate to based on their academic and extracurricular interests. We found through our research that there is a heavy importance on the role of social media during the transition to college, and relationship building is pivotal during this time period [7]. With this in mind, it is important to base our design off of the capabilities it provides other students to connect, which inspired our "About Me" page to include contact information and basic facts about students so that others users can form off-site connections after interacting on the site.

Through research on multiple instances of AI Chatbots being integrated into multiple elements of the lives of college students, we found that the use of Chatbots can actually help to improve students' thinking ability and expectations in higher education [3]. While our sources mainly focus on AI that is used in a purely academic context, benefits could possibly be extended to the work of an academically-focused AI Chatbot that exists on a social media platform such as ours. We want users to feel confident that our AI Chatbot will be able to provide them with the best knowledge it can through reported experiences and data released by the institution itself, and furthermore feel empowered to have their questions answered in lieu of responses from other students. If our AI Chatbot would direct students to useful resources, we would hope that they would in turn be given the resources they need to excel in other elements of their collegiate lives.

There do exist limitations within our work, as social media integrated into academic spaces does not have a mass of supporting empirical evidence, despite academics arguing for it [6]. It is noted that most of the data collected on the usefulness of social media for college students is based on self-reported data which contains some inherent biases, thus it would be interesting to research reception to the site if it were to eventually be released broadley to the Wellesley community.

Methods

To implement our website idea, we followed an iterative design and evaluation process. We focused on the

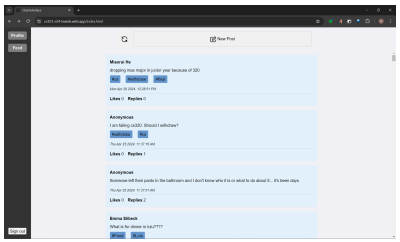

Figure 1: A screenshot of the main feed page for Wellesley Asks Nico. This is the default landing page after logging in, and posts are sorted in reverse-chronological order.

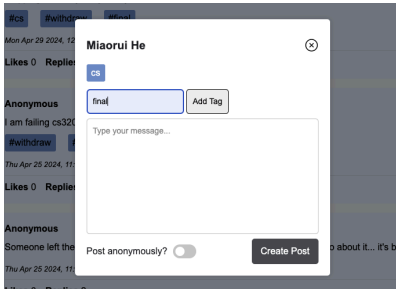

Figure 2: A screenshot of the *Create New Post* pop-up interface. A successfully added tag is displayed above the input box. At the bottom of the pop-up is the anonymity toggle, which can be turned on for anonymous posting.

front-end development of our platform, using Firebase to host the website and serve as the backend database.

First, we produced initial sketches for the website design and an entity relationship diagram (ERD) that captured the general structure of data and interactions on our platform, which were both presented for feedback from students in CS323: Social Computing. Then, we built a working low-fidelity prototype by modifying the provided starter code, which was originally designed as a chat-based interface, into a scrolling feed interface populated with posts, and connected Firebase to our website in order to read and write user data. The working prototype contained most of the basic functions of our platform, including posting, commenting, tagging, and liking. Finally, we built a final high-fidelity prototype, both implementing new features (AI responses, anonymous posting, and comment ranking) and refining existing features. Project members worked collaboratively to fulfill each project milestone.

With each iteration of the prototype, we also collected user feedback from other students in CS323: Social Computing by conducting in-class evaluations. For the first in-class evaluation, we focused mainly on the ease of navigation and the intuitiveness of the interface design. We received 19 unique responses, and the feedback was used to guide our design decisions for the final prototype. A second in-class evaluation was conducted for the high-fidelity prototype. For this evaluation, we maintained our emphasis on intuitiveness of use, but we also probed the testers on the perceived usefulness of the new features that had been implemented as well as moderation and privacy concerns. We collected feedback from the same user testing pool as the first evaluation, and received 20 unique responses.

Design and implementation

Wellesley Asks Nico is a social media platform designed to facilitate student-to-student interaction by encouraging posting and commenting behaviors while ensuring that no questions are left unanswered. Previous literature has identified social media as a crucial element in enhancing the college experience by facilitating peer relationships and fostering highly connected learning communities [6]. In order to encourage such benefits, we designed several core features for our platform: (1) a chronologically sorted feed interface; (2) a tagging system; (3) a ranked comment section with an automatic AI response; and (4) an anonymity toggle for posting and commenting.

Feed interface

The main page of our website consists of a scrollable feed container, as the main purpose of our platform is to view and interact with posts. The feed container is populated by posts created by users of the website, sorted in reverse-chronological order (Figure 1), similar to Facebook's *Most Recent* sorting option for the News Feed [5]. We chose to implement this as the default sorting option as an attempt to remove algorithmic bias and provide full transparency to users about the feed order. A refresh button located at the top of the feed container reloads the page on click, thus allowing users to see new posts as they appear. Users can also create a new post directly from this page, and the newly created post will appear at the top of the feed upon successful creation. Loading posts into the feed container requires reading existing data from the Firestore database, while creating a new post writes a new Firestore *post* document based on the user input data. In order to sort the posts in reverse chronological order, the timestamp of when the user hit send on the post is saved as an attribute.

Tagging system

Drawing from our team's personal experiences with other social media platforms targeted at the Wellesley

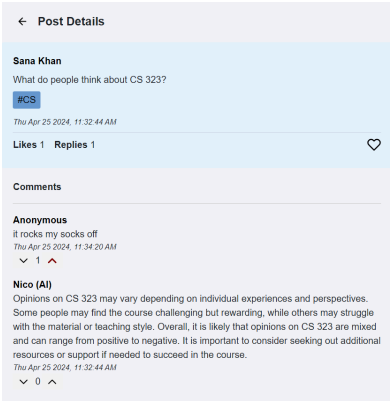

Figure 3: This is the post details page for a question posed by a student about a computer science course offered by Wellesley College. Comments in the comment section are ranked in order of upvotes, and comments that have already been upvoted by the logged in user are marked by a red icon. This example displays an anonymous comment and a comment generated by Nico. Unfortunately, Nico has not been trained on Wellesley-specific questions, and thus cannot offer accurate information about CS323.

Figure 4: An example of an anonymous post containing potentially sensitive information. When anonymous posting is toggled on, the usual display name is replaced with "Anonymous".

community (e.g., Wellesley FAQ Facebook Group), we observed that user usage was sporadic, primarily during periods of specific need like course selection or housing registration weeks, rather than daily. This led us to concerns that users might not find the content on the Wellesley FAQ page consistently relevant to their academic interests and college experience, preventing them from developing the habit of daily participation. To address this issue of user engagement, we developed a tagging feature that allows users to navigate our platform more effectively. This system allows filtering of posts tailored to individual interests, thereby encouraging more frequent and meaningful participation.

By incorporating the tagging system, users can create tags relevant to the subjects of their posts. These tags appear alongside the posts in the public feed. Users can also click on a tag to explore all posts containing the same tag, thus targeting their specific interests.

In our implementation of the tagging system, we use abundant visual instructions to make navigation more intuitive for users. We designed a post creation page that includes both a tag input box and a post content input box. When users click the "add tag" button, their input is stored in the system, and the tag appears above the input box to confirm successful entry (Figure 2). Upon clicking the "send" button to submit their post, the tag and post content are updated to the Firestore database and stored as two separate fields within the post collection. Tags are stored as an array and are displayed individually in the feed. Each tag is presented as a clickable button embedded with a separate link. Clicking this link takes users to a filtered version of the public feed, showing only posts that contain the same tag in the Firestore database.

Comment section
Another key feature of our platform is the comment section of each post. Users are able to view the comment section by clicking into the post details of a post on the feed page. The comment section consists of any comments created by (human) users and one comment automatically generated by AI, posted under the name Nico (AI). When a user asks a question (i.e., creates a post), an automatic response is always generated by Nico (Figure 3). This functionality sets our system apart from platforms like Facebook's Wellesley FAQ, where user interactions are limited to responses from other users. Theoretically, Nico would provide immediate answers and use machine learning to tailor responses based on frequently asked questions, user preferences, and publicly available information regarding Wellesley College, thus enhancing the relevance and utility of each interaction. Currently, Nico is implemented through the built-in Firebase AI response retrieval function. In Firestore, both user comments and AI comments are added as *comment* documents to the *comments* collection under a *post*.

Additionally, in order to ensure visibility of the most relevant and helpful responses to each post, we designed a system of upvoting and downvoting comments (Figure 3). Through this form of community-based moderation, the responses deemed by majority to be the most useful will appear at the top of the comment section. This system also adds a simple way to engage with content, potentially encouraging user retention, especially for users who may prefer to lurk. In order to implement this feature, each *comment* document in the Firestore database contains a data field which stores the IDs of users who have voted, and the voting score is calculated and updated accordingly.

Anonymous posting and commenting
The final core feature in our design is the anonymous toggle, which is displayed in the *Create New Post* dialogue (Figure 2) and above comment input fields. This feature allows users to post and comment anonymously (Figure 4). Studies have shown that anonymity may allow social media users to feel more

comfortable sharing content that may be otherwise difficult to share (i.e., content with more negative valence, or more intimate information) [4]. By enabling anonymity, we encourage a wider range of conversations, especially from users who may typically assume the role of a lurker on social platforms. The anonymity switch is designed to lower barriers to participation by reducing the fear of judgment or negative feedback, thereby fostering a more inclusive and diverse dialogue. However, anonymity can also pose an increased risk of abusive and toxic posting behavior [2]. To mitigate this, we implemented the anonymous function by storing "Anonymous" in place of a user's full name in the newly created Firestore document, but the user's ID will still be associated with the post.

Limitations to features

While we were able to successfully implement many of our features and designs, there are still some bugs left to fix, and some features are still works-in-progress. One such feature is Nico, the AI comment generator. Given enough time and resources, we would have liked to train Nico on information specific to Wellesley, thus fine-tuning its responses, and also set a confidence threshold so that Nico only generates a response if it is confident that it has the right answer. This will make the AI feature more useful and reliable, because otherwise, it may generate false information (as seen in Figure 3). Another feature we did not have time to implement is a toggle that allows users to choose whether or not they want to generate an AI response for their post. Some questions, especially those concerning personal experiences or anecdotes, are only suitable to be answered by other students. Finally, since only comment upvoting is currently functional, we were not able to fully implement the comment voting system. If there was some more time, we would have also liked to implement the downvote feature, since downvotes can be just as informative about the relevance and reliability of a response.

Results from the evaluations

Throughout the process of developing Wellesley Ask Nico, we conducted two rounds of user testing at different project milestones. The first round of user testing focuses on user feedback of our basic design ideas to help us navigate a clear path and a design direction we should pursue. The second round of user testing helps us to validate our design with a sophisticated working prototype.

Based on the feedback from the first evaluation, many of the testers validated our design direction indicating that they would be interested in using a platform like ours to browse for questions about courses and other Wellesley-related information. Several of the testers appreciated the current navigation system and found the UI to be relatively intuitive and natural, but others noted possible areas for improvement, with one main issue being how the posts are displayed within the feed. Several people mentioned that there should be a more intuitive and transparent sorting of the feed, either with posts appearing in reverse chronological order or in order of the like count. Another one of the features that many testers reported was buggy was the tagging system. Although the existence of the tag filtering system was noted as a strength, there were issues with adding tags: tags that were previously created could not be deleted, and some people accidentally added empty tags to their posts. Some of the testers also recommended creating preset tags so that the tagging system could be more coherent. Finally, there were conflicting opinions on anonymity on the platform: while some people expressed the belief that displaying full names will enforce accountability, others expressed concern over doxing and other deterrents to active posting (especially for possibly sensitive topics) due to

the fact that our profiles currently display the user's full name and Wellesley email address.

In response to the feedback we received from the in-class evaluations, as well as other known bugs that were previously noted, we made several adjustments to the feed. Posts are now displayed in reverse chronological order, and we added a refresh button to enhance navigation. We also refined the posting process by allowing users to post anonymously, thereby encouraging more participation on the social media platform. In the comment section, we introduced AI-generated responses and enabled upvoting and downvoting of comments. Comments are sorted by the number of upvotes, helping users better assess the trustworthiness of the social media environment. To prevent issues with the tagging system, we implemented strict user input re-formatting. This includes reminders for invalid input and prompts for users to validate their tag input if they forget to hit the "add tag" button. Finally, we enhanced the user profile page by introducing basic user information, which helps to establish trust among users and encourages community bonding.

In the second round of evaluation with a functional prototype, many users reported that the navigation process was straightforward and intuitive, with every section clearly laid out by the UI. After refining the posting and tagging functionalities, users found it very useful to see comments ordered by upvotes, helping them filter the most relevant and useful information. They also found the tagging system helpful for filtering content and tailoring their browsing experience to meet personal academic needs. Despite a few concerns that the anonymous posting option could hinder user bonding and the formation of social connections, most users enjoyed this feature, stating that it made them feel more comfortable posting questions without fear of judgment, thereby enhancing their sense of safety. Additionally, some users pointed out that the profile page facilitates real-life connections. Through interactions in post comments, users can click on a profile to see an email address and potentially reach out to continue communication offline. Users also expressed interest in the AI response feature. One user noted that the AI's immediate replies provided reassurance while waiting for comments from other students. Since most users indicated that seeing comments greatly motivated them to post and participate on the platform, the AI's immediate response was seen as a boost to user engagement. For possible future implementation, several users expressed interest in a search function that enables searches by both post content and tags, which would further assist users in finding the most relevant information for their interests.

Throughout the evaluation process, user feedback has been instrumental in identifying areas for improvement and validating our design concepts. A key focus has been on our tagging system, where diverse user inputs often led to bugs that prevented successful tag creation and display. Through real-user evaluations and by observing the full operational process, we were able to identify potential errors in user-computer interaction and enhance the overall user experience. Feedback also highlighted new potential uses for the platform, such as enabling students to reach out to others who comment on posts through direct messages, which could facilitate further social interaction and serve as a new direction for design development. Overall, users expressed a strong interest in our platform, particularly noting features like comment interactions and AI implementations as being aligned with our initial design vision, thus affirming the effectiveness of our design approach.

Partnership with CS343

Our collaboration with CS 343 has provided us with valuable insights into backend processes, complementing our project's focus on frontend design.

During our initial session with the CS 343 class, we practiced creating Entity-Relationship Diagrams (ERDs), which helped us to conceptualize the backend structure in parallel with our database development. In subsequent meetings, we communicated our design approach, which treats posts and users as separate major data collections. Specifically, the post collection includes various fields such as comments, tags, and other affiliated sub-datasets, aligning our front-end design closely with the underlying data architecture. While we were unable to successfully connect our project with the CS343 database, we were able to discuss and understand how our designs could theoretically be linked together.

One of the key takeaways from our partnership with CS343 is having a better understanding of how our firebase worked from a backend perspective. This allowed us to reflect on how we organized our collections and why we organized it in such a way. It also taught us about effective communication, as it was vital that the CS323 students understood our vision and even more so that they could create a database architecture matching the structure that we had set up in Firestore, the database we are currently using.

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