Course Connect Final Report

Human Computer Interaction

Frances Peters
Khoury College of CS
Northeastern University
peters.f@northeastern.edu

Jolin Huang
Khoury College of CS
Northeastern University
Boston, MA
huang.jol@northeastern.edu

Olivia Li
Khoury College of CS
Northeastern University
Boston, MA
li.ol@northeastern.edu

Devyanshi Chandra
Khoury College of CS
Northeastern University
Boston, MA
chandra.d@northeastern.edu

INTRODUCTION

Belongingness refers to an individual's sense of feeling accepted and comfortable within specific social contexts and spaces, existing in contrast to social isolation. In fact, belongingness has been referred to as the "fabric that connects the self with others, places, and objects" and is at the basis for a person to form a community. However, as adolescents leave home and are introduced to the university community, the search for a sense of belonging can be difficult and stressful if there's a lack of support.

Over the course of four months, the team conducted preliminary interviews and research to gage specifically Northeastern University's student-body community and identify pain points and struggles when building and maintaining meaningful relationships, as well as current sentiment regarding the use of technology when meeting and joining new communities. We investigated common activities that the average Northeastern student, across all grades, fields of study, and preferences engage in. We created two initial prototypes that encompassed two activities that most students engage in– eating on campus as well as attending and completing work for classes. The two prototypes were then tested across four subjects to examine the utility, design efficacy and choices, and efficiency for the subjects.

Finally, the team decided upon one of the initial prototypes– NUConnect. A high-fidelity prototype was developed and tested in order to assess it as a technological approach to assisting the average Northeastern student in building meaningful connections with other students. NUConnect is an application designed to be affiliated with Northeastern University and allows students to find students in the same classes as them to form study groups. NUConnect serves as an example of a common interface that university students could use to foster a sense of belongingness as well as maintain interpersonal relationships, both online and in-person.

BACKGROUND/SIGNIFICANCE

Following the onset of the pandemic, several young adults and teenagers have felt an overall decline in social connectivity due to the prolonged social isolation that came with quarantining. According to multiple studies conducted by the National Institute of Health, adolescents who went through or begun their formative years during the pandemic have reported higher rates of anxiety, isolation, depression, and general mental distress (Meade, 2021). A key attribution to the decline in mental wellbeing is social isolation, one that has seemingly carried into current college students' perceptions of community, connectivity and *belongingness*.

The need for belongingness gradually increases as external, societal, and/or personal stress increases–however oftentimes, the communities that need belongingness the most feel the most neglected (Pardede et al.). With such prolonged in-person social isolation and deficiency in community building, there has been a collective shift in attempting to mimic the interpersonal relations that existed prior to COVID-19. Although this shift had begun prior to the pandemic, with the introduction of social media such as Instagram, Facebook, TikTok, and Twitter, the necessity of

digital and technical spaces truly came to fruition in the physical social isolation of the pandemic.

Digital spaces are known as virtual environments or platforms where people interact, share, and consume information through digital technology. These spaces have now become a crucial component to our day-to-day lives, facilitating communication, collaboration, entertainment, learning, and various other activities in a non-physical, online environment. Technology as it continues to advance has propelled the creation of niche communities, formed based on interests, experiences, hobbies, etc. This introduces our primary focus– the use of technology in creating a sense of belongingness at Northeastern University as we welcome students who have spent their formative years during the pandemic.

1. Design Hypothesis and Intent

Our research is primarily focused on Northeastern University, located in the heart of the city of Boston with over 15,000 undergraduate students (Northeastern, 2025). We intended to assess the overall sentiment on campus and how Northeastern students tend to pursue joining a community, or what may be preventing them from doing so. Additionally, we focused on whether current technology, either provided by the university or generally available to the public, plays a role in building a sense of belongingness. Lastly, we intended to focus on a unified solution that could be applicable to most, if not all students, rather than focusing on a specific subset of students.

For our design hypothesis, we identified an overall problem after conducting our preliminary research and interviews– NEU Students feel as if there is a lack of an overall common space or technology to foster a sense of belongingness and find communities. Our solution is to provide students with an application that caters to many students and pushes them to meet on campus, in-person. Results will be measured based on usability and feedback of our prototypes.

METHOD/APPROACH

Our methods involved conducting two interviews with current Northeastern students to better understand their approach to belongingness. From our interview findings we were able to create two user personas that summarized our findings into sample users. Based on our interviews and user personas we then transitioned into the ideation phase of our design process, creating simplistic paper prototypes for two of our most promising ideas. The paper prototype evaluation was conducted with two different Northeastern students where we were able to evaluate the usability of our interfaces and move into the process of finalizing one final idea. During this phase we prioritized functional and non-functional design requirements and refined the structure of our interface.

1 Formative Interviews

To accurately address the goal of creating an application to promote belongingness among Northeastern students it was vital to gather qualitative research from current students. We interviewed two Northeastern students to further understand their current approach to belongingness and how they form connections with other students. To ensure our findings remained reliable and unbiased we chose to ask students at random to participate in the interview. One interview took place in a campus dining hall while the other was conducted in Rennaissance Park. Our interview questions were designed to understand the interviewee's perception through questions that targeted their opinion, experience, and feeling. It was important to not just understand the participant's personal definition of belongingness but also understand how they currently find themselves forming connections.

There were many similarities between the way our interviews defined belongingness within the Northeastern community and approached forming new connections. Both interviewees viewed belongingness as something that revolves around connections within a community through comfortability, friendships, and shared activities saying that "it's more like the people than the location that builds the sense of belonging at Northeastern" (Interviewee 1).

One thing that was vital to understand during our interview process was how students currently formed these connections with other students, especially if this was the primary factor in feeling that sense of belonging. Interviewee 1 brought up how many of their friendships were formed through repeated interactions and shared experiences. For example, they described how the process of struggling with another person in a course was often a way they connected with another person and transitioned into a friendship. One important takeaway was how both interviewees found that the connections they formed were stronger in-person and involved a shared activity. Interviewee 2 also described how it was easier to make connections with other students in a classroom setting.

After our interviewees we were able to deteriine that a major factor of feeling a sense of belongingness at Northeastern was through community connections with other students.

We also understood that it was important to form these connections in an in-person setting and through shared acticity. A setting where both interviewees found themselves forming connections was in a classroom. (1)

2 Persona

Our interviewees gave us a better understanding of what Northeastern students approached finding a sense of belongingness on campus. Using the qualitative data, we collected during the interviews were able to create a user persona called Jenna Johnson.

(1)

Jenna is a second year Computer science and Design student at Northeastern University. She is 19 years old and primarily her technology use is primarily texting, Instagram, and Snapchat for connection. She is a socially driven, experience-oriented student who builds a sense of belonging through shared academic and personal challenges. She thrives on repeated interactions and deepening connections over time. Jenna's has three main goals. She wants to strengthen friendships through shared experiences in academics and social settings. She wants to connect with classmates to create a support system for coursework and challenges. She wants to recognize people in everyday spaces and develop a sense of belonging through repeated interactions. Jenna's pains points are feeling nervous in new classes or large social settings without familiar faces. She sometimes struggles to keep in touch with people outside of daily routines or shared classes. When it comes to coursework, she feels isolated unless there's a support system.

> "At the beginning of the semester, if there's a class I'm nervous about, seeing someone I know is always a relief. The more I see and talk to people, even in small ways, the more comfortable and connected I feel."

Variable 1: Method of Social Interaction

——-O----------
IN PERSON ONLINE/REMOTE

Variable 2: Environment
——————-O----------
ACADEMIC SOCIAL/CULTURAL

Variable 3: Self Advocacy
——————O----------
INDEPENDENT NEEDS SUPPORT

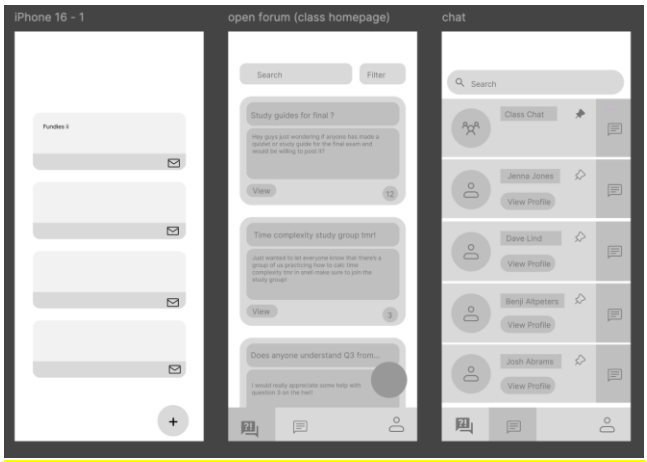
Variable 4: Preferred Social Setting
——————O----------
ONE-ON-ONE GROUP

Jenna has found that her sense of belonging is shaped more by the people she meets than the physical location. She forms strong connections with classmates, especially those she has struggled alongside in difficult courses. Jenna finds that shared experiences, like studying abroad or tackling tough projects together, create lasting friendships. She uses Snapchat, Instagram, and texting to maintain these connections, but face-to-face interaction is what truly strengthens her relationships. Seeing someone repeatedly, whether in class or through mutual activities, helps her open up and build familiarity over time.

3 Paper Prototypes

After coming up with fifteen unique ideas to address the belongingness at Northeastern we developed two paper prototypes. The first one is called CourseConnect and focused on in class connections. The second prototype is called Meet n' Eat and focused on shared activities such as getting food with other students. Our prototypes were created with a focus on the structure and main usability features of the interface rather than specific details to make participants more comfortable giving feedback during the prototype evaluation.

CourseConnect Paper Prototype

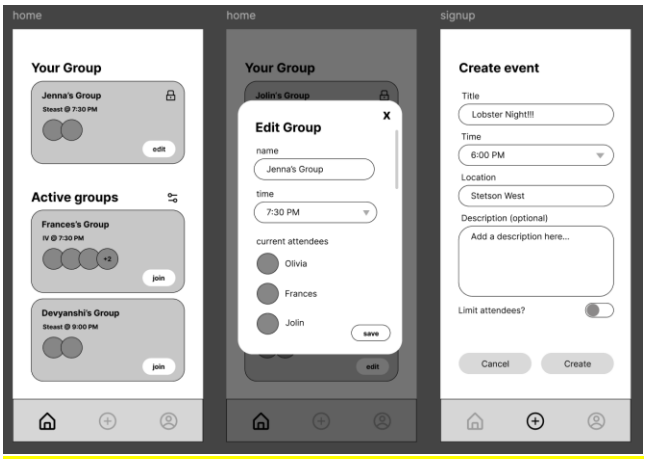


Our first prototype is a mobile application called CourseConnect that aims to give students a sense of belongingness by connecting them with other students in their classes. We chose to make this app very class focused as many of our interviewees and developed user persona preferred to build connections with students through in person experiences and share struggles.

This app has a goal of making it easier for students to bridge the gap between recognizing someone in class to actually getting to know them. CourseConnect is a mobile app, which includes the ability to join Northeastern class sections, see other student profiles in the same class, post questions on the class forum, create study groups(time, place, topic), join study groups, direct message other students, class wide group chat, and profile customization (add year, interests, prompts, major, etc.).

It helps students form connections in classroom/lecture settings and promotes familiarity among students by mitigating the struggles and breaking the barriers that come with approaching classmates for the first time. CourseConnect aims to amplify the ability for classes to become a setting where students can connect with others through shared academic experiences or struggles. It's a more personalized class connection app compared to current applications like Canvas and Piazza. Focuses on finding in class connections rather than extracurricular connections.

Meet n' Eat Paper Prototype



Our second prototype is an application called Meet n' Eat that helps university students connect with others by setting them up with students that have similar schedules to dine together at dining halls. Many students feel that not only is it hard for them to connect with others, but they also find it difficult to go to the dining hall alone. This application would help combat both of these issues while also working around busy schedules.

Meet n' Eat would have the ability to set your availability, customize profiles, create and join groups to go to dining halls based on your availability, and add friends to re-invite to dining halls. It helps achieve the goal of allowing students to make friends with other students at their university and prevent feelings of isolation in dining halls by removing the constraint of cold approaching students in dining halls or finding students with similar dining schedules.

Meet n' amplifies the pre-existing notion of food/eating as a strong social bonding experience and allowing for repeated connections on campus. There are apps like when2meet to plan for availability, but there is no app dedicated to connecting students to go to dining halls together yet. As of now, students can only plan to eat with others in person or via social media/messages, which may be hard for those that don't have prior connections and are looking to make some.

4 Paper Prototypes Evaluation

The paper prototype evaluations were conducted with two Northeastern students chosen at random to ensure reliability. Interviewee 1 was found at Snell library and is a second year Biology major which is also where the interview

took place. Both interviews lasted approximately 10-15 minutes.

Our prototype evaluations gave us a better understanding of spaces where our interface could use refinement in its structure.

One challenge for the interviewees was recognition of the icons we were using, specifically for the study pages in CourseConenct. Instead, it was recognized as a directory. This helped us determine that we needed a clearer way to represent the different tabs and in our final protype we added labels.

Another design implication was a lack of error prevention in the 'edit' pages of CourseConnect. Users have the option to edit their profile prompts and course list, however, there was no second message confirming and changes. During our prototype evaluation interviewee 1 described wanting a secondary alert that checked if they were sure they wanted to save their changes, specially while deleting prompts on their profile. Later in the final prototype we incorporated this element of error prevention in multiple areas, both the profile and the course page.

During the evaluation, the interviewees enjoyed the level of personalization since it gave more control to the user. This also allowed for them to choose how much information they felt comfortable sharing since the personalization feature, such as the prompts and interests in CourseConnect, allowed for users to opt out. This enabled us to understand how users would like the option of personalization in the interface as it offers the ability to enhance social presence and foster more genuine connections between students.

5 Design Requirements

Our application has three functional and non-functional design requirements that define the characteristics of our interface.

Functional Requirements

- **Our app must utilize recognizable icons, or include labels/descriptions.** Unfamiliar icons can confuse users making the app harder to navigate. If the icons need a lot of effort to understand, users could become frustrated. By using more recognizable icons, we can reduce cognitive load and make actions more efficient. In our paper prototype evaluations, users easily understood the function of more common icons but were more confused with an unfamiliar icon that was in the navbar.
- **Our app must have clear indications for each action**. Users may struggle to understand system feedback if the action lacks clear indicators. Since users need immediate and visible feedback to maintain a sense of control, our app should utilize animations, color changes, and confirmation messages. For example, we can add extra indication for when a message has successfully been sent.
- **Our app must allow users to customize their profiles and posts.** Users emphasized a desire for personalization to enhance their sense of belonging. Allowing students to customize their profile information, study interest, and interaction preferences can foster engagement. This will allow users to connect with students based on similar interests or circumstances, which is something that is valued by our user persona.

Non-functional Requirements

- **Learnability/Usability:** Our app should be easy for students of any audience to learn and use. To do so, we must utilize a combination of an intuitive onboarding experience, clear icons/navigation, simple language, and minimalistic design. Our prototype evaluation underlined the importance of having icons that are easily recognizable, especially for important tab navigation.
- **Effectiveness:** In our app, it should be easy to complete tasks (e.g. finding and messaging another student) which we can accomplish with clear navigation, hierarchy, and icons that follow conventions so that users will intuitively know what to click next and where to find their next objective to complete their task. One of the goals of our application is to ensure that users are able to form connections in-person. We want to avoid over-complicated the features of our application and focus instead on creating a way to start and maintain these social connections. For users like Jenna, they want the app to remain effective in prioritizing face-to-face interactions.
- **Safety:** Our app should minimize and prevent possible errors and incorporate easy recovery when errors do occur. In order to do this, we must incorporate many options to backtrack/return and undo, confirmation messages for important decisions, give control over privacy to users, and more.

6 Design Framework

CourseConnect has a Sovereign Posture meaning it commands attention and expects the user to engage actively with the interface (About Face Chapter 9 – Platform and Posture, pg. 208). This is due to the expectation that users are intentionally opening it to view the features such as the forum posts or to join a study group. Additionally, it included many types of content with aspects such as a dashboard, forum tab, messages, and profile page. The main types of key data that users will interact with are the registered course pages, profile pages, forum posts, messages, and study group posts. When creating the key elements of our user interface it was important to support the functional and non-functional requirements discussed previously.

Our first functional requirement outlined the importance of recognition and familiarity. This closely aligns with the "Match Between the System and the Real World" heuristic that describes the way interfaces can reinforce usability by using familiar symbolism and layout that create a natural user experience (RSP Chapter 16, pg 584). When creating our paper prototype, we used icons that closely resemble real world examples that would be familiar to the user, such as the push pin representing the ability to pin a chat. During our paper prototype evaluation, we found that some of the pages that the icons represented did not have a strong enough relation to one another. This was specifically in regard to the book icon representing the study group tab. To avoid confusion, we decided to include labels under the tab navigation icons to increase the ease of navigation and avoid slips. Another aspect of our interface that aligns with the non-functional requirement of recognition and familiarity is the way we structured our layout. We chose to model our interface after preexisting educational applications such as Piazza and Canvas. Users that are already familiar with Piazza and Canvas will already have some level of a conceptual model built, giving them a better understanding of how they can interact with it.

The second functional requirement that we addressed in our interface focused on having clear indication of actions. When designing our interface, we incorporated the "Help and Documentation" heuristic which describes the importance of supplying sufficient documentation regarding user tasks (RSP Chapter 16, pg 585). One way we implemented this was by providing clear indications of tasks in spaces like the on boarding process using methods such as clear labels of required user input, sliding animations to show progression, and an onboarding status bar to show the remaining pages. Another example would be the confirmation label of messages sent.

The third functional requirement was the ability for personalization. This was important not just to allow for users to create stronger social connection via profile personalization but also to allow for user privacy personalization to account for varied user preferences. To provide personalization features we included profile pages for users where they are able to add prompts, interests, and a bio. Users are able to view other students' profiles and send friend requests. When designing this personalized part of our interface we considered Value Sensitive Design, incorporating values into our design (Slidedeck 11, pg. 33). For direct stakeholders that valued their privacy and preferred not to have a personalized profile page they were given the option to skip the personalization features in our onboarding process.

The first non-functional design requirement underlines the importance of learnability of the interface. To promote learnability, we used a similar model to other interfaces that are commonly used in education, Canvas and Piazza.

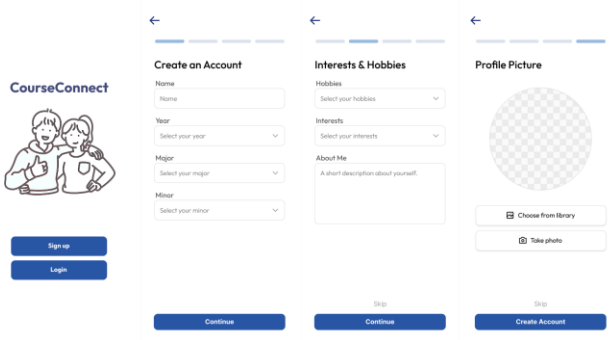
The second non-functional requirement focuses on effectiveness of the interface. One goal of our application is to be a mediator in creating in-person connections. To accomplish this, we focused on using design elements like Gestalt's Principles which focus on hierarchical organization (Slidedeck 3.1, pg. 73-88). We used the principle of grouping when structuring the search options when a user adds an additional course. We also used the principle of common region to emphasize the separation between posts in the forum and study groups tabs.

The last non-functional requirement focuses on error prevention. We incorporated this in our interface by using the "Error Prevention" heuristic that describes the ability for users to avoid and recover from errors (RSP Chapter 16, pg 585). The features that help users avoid errors are in the edit pages of our course and profile tabs. We provide a confirmation option for users to confirm their changes to their course list and profile prompts. We also include accessible cancel buttons to navigate out of pages like creating a new forum post or study group.

To provide a better understanding of the context in which the application CourseConnect would be use we have created a sample scenario of a student's interaction:

It is the start of the semester and Jenna is feeling nervous about not knowing anyone in her Algorithms &

Data Structures course, especially since it is known for being a difficult course. Jenna added Algorithms & Data Structures to her course dashboard on CourseConnect. She then navigates to the course and opens the people tab. Scrolling through she clicks on John Doe's profile and notices a prompt saying EXP is his go to study spot. Jenna also likes to study at EXP and messages him to see if he would like to study at EXP for their first quiz tomorrow. John responds and decides to create a new study group post so that other students can join them too.



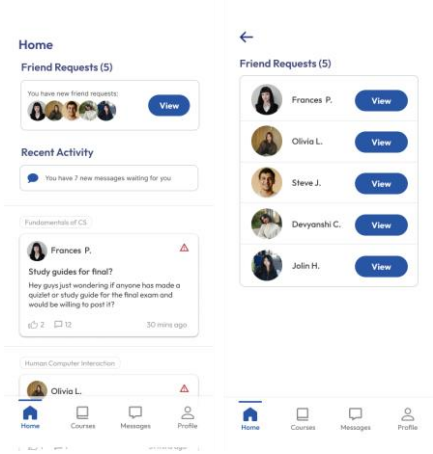
PROTOYPE/INNOVATION

1 Overview

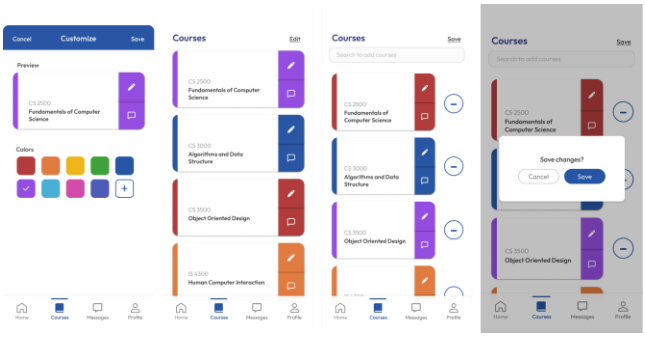
CourseConnect provides students a platform that allows them to interact with students in their classes with a personalized, community-driven interface. The following contains key features and user flows of the app. Link to Figma Prototype

Our prototype begins with the log in flow, where users create their profile. Users can switch between each step if they want to edit their information before creating their account.

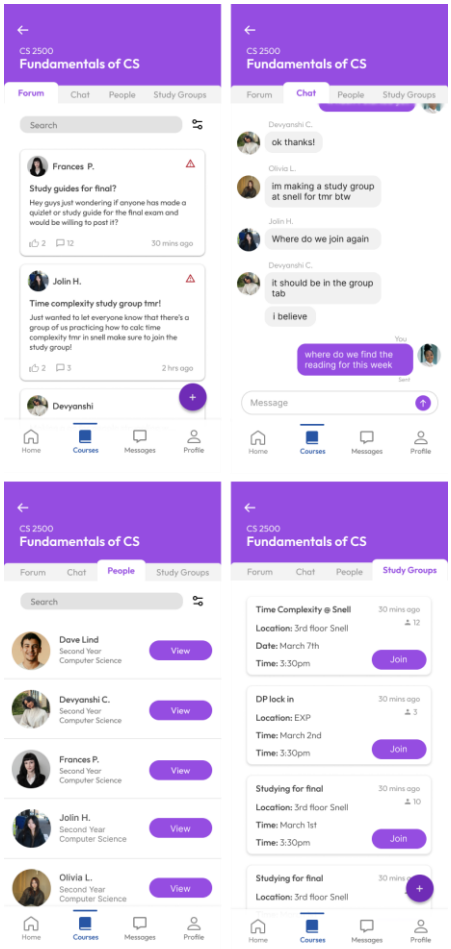
Home Screen - Upon creating an account, the user is greeted with a home page, containing an overview of friend requests, recent activity, and recent class forum posts. The prototype illustrates an account that has already been populated with data.



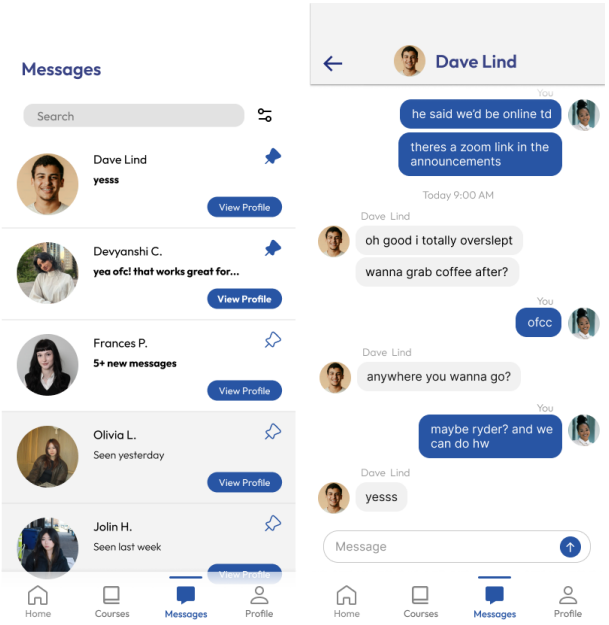
Courses Tab – Users can navigate to the courses tab, where they will find their courses. Users can add/delete courses using the edit button on the top right. The theme/color of each course can also be edited by pressing the pencil icon next to each course card.



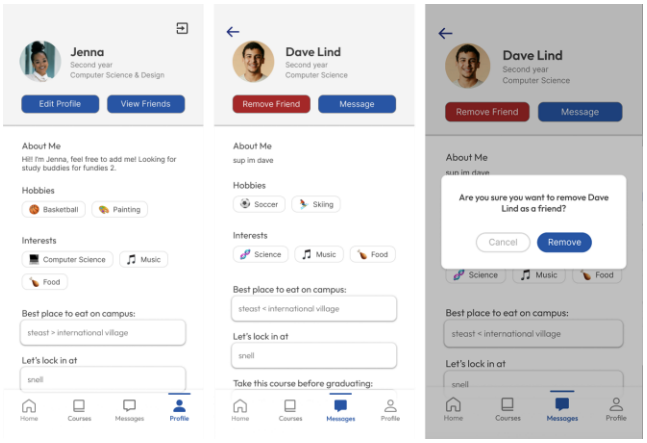
Course Pages– Each course has its own course page. Within each course page, there are four tabs: Forum, Chat, People, and Study Groups. These pages provide an organized space for student-student communication within specific courses.



Messages Tab– The messages tab contains all of the user's personal messages with their classmates. Users can pin or search for conversations, as well as view other users' profiles from this tab.



Profile Tab– The profile tab includes the user's name, year, major, as well as their interests, and prompts. Other users' profiles also consist of this information, allowing users to connect with classmates that they resonate with. Users can add/remove friends.



2 Innovation

Our innovation lies in creating a centralized platform that bridges the gap between academic and social connections among students, fighting the bias of the classroom being a strictly academic space. Following our design hypothesis—if we created an app that allowed students to connect with other students, it would help them achieve the goal of making more connections in their classes by mitigating the struggles and breaking the barriers

that come with approaching classmates for the first time—we designed an application for students to interact and engage with others on both academic and personal levels, acting as a space to foster familiarity while also encouraging collaborative academic support.

Unlike similar existing technologies such as Canvas or Piazza, which are not only primarily structured for academic content but highly moderated, CourseConnect is built on principles of social interaction design, focusing on supporting communication among students. Existing platforms support facilitation of announcements, assignments, discussions, and grading, which lean more towards instructional use. They lack the social affordances that promote getting to know each other and building bonds. CourseConnect targets students instead of faculty, allowing multiple forms of communication and engagement, from messaging and open forums to study groups.

3 Implementation

To implement CourseConnect, we would utilize web-based development technologies, specifically HTML, CSS, and JavaScript, with React Native as the primary framework to support cross-platform functionality on both Android and iOS devices. This allows for consistency and responsiveness across platforms and expands the user base.

To populate the app with accurate course data, including names, sections, and course codes, we would employ web scraping techniques to extract information directly from Northeastern University's course catalog. User verification would also be handled by integrating Duo Security's two-factor authentication system, which ensures that only valid members of the Northeastern community can interact with the platform.

We would effectively implement CourseConnect within the Northeastern ecosystem by engaging with a range of stakeholders. As primary users, students would play a major role in usability testing, and feedback. Academic advisors and professors would also provide insights about how to prevent situations like academic dishonesty and harassment within platforms like CourseConnect. Collaborations with Northeastern offices such as Center for Intercultural Engagement and Global Student Success will also guide equitable design decisions to better serve underrepresented communities at Northeastern.

DISCUSSION

1 Design Implications

During our research and ideation process, we interviewed several students on campus about their experiences with belongingness, and a few key insights emerged that helped shape the direction of our design.

One of our biggest takeaways was that genuine, meaningful connections usually came from repeated interactions with peers that share similar interests or experiences. Socialization is a fundamental aspect of daily life, whether that means keeping your family and friends up to date about what's happening in your life or discussing current events with a coworker (Yvonne et al., pg. 136). We wanted to consider how we could translate this experience of connection and day-to-day socialization over to a digital interface.

The universal adoption of social media has undoubtedly changed the way people interact and communicate with each other, many still feel that in-person spontaneous conversation is a skill that shouldn't be discarded (Yvonne et al., pg. 139). CourseConnect acknowledges this, which is why we encourage not only online interaction but also offline, in the form of study groups, to help students transition from digital familiarity to real-world friendships. A key aspect of social computing is visibility and social proxies—seeing and letting others know see user presence, such as who's present or when an activity occurs (Erickson et al., pg. 41). As seen with other precedents, we allow users to see the status of others when messaging them. For example, seeing who is present in a group chat, or seeing when someone has seen your message, which is highly important when it comes to online communication because you can't see other users physically, which can cause people to miss visual social cues.

Additionally, as we tested and refined our ideas, we realized that pushing people to engage with each other could instead end up being counterproductive, as people may feel uncomfortable when being forced to socialize. Instead, we aimed to support user autonomy and self-expression, allowing them to engage at their own pace and comfort level. In our final prototype, we incorporated this idea by giving users many customization options for their profiles, which acts as a social affordance, helping others understand who may share their interests without the awkwardness of forced icebreakers. We also incorporated both low-barrier participation options and more active ones, so that anyone could participate whether through simply lurking and reacting to posts or through direct messaging. Designers should avoid assuming a working design for one audience to work for everyone else as well. What works for an outgoing user may not work as well for an introverted one. By considering audiences that were both introverted

and outgoing when designing our interface, we aimed to encourage feelings of comfort, trust, and confidence.

2 Broader Implications

To better understand how our design affects both individuals and communities, we used the Value Sensitive Design approach, which emphasizes incorporating human values into the design process in a principled way to ensure that our design meets not only functional requirements but also considers the social context of its use and values that users may find important (Yoo et al., pg. 419).

Direct stakeholders could be the students who may use our platform to build a sense of connection and community with others in their classes. The users come from a diverse range of backgrounds and personality types.

Indirect stakeholders could include student organizations, university faculty, and even other peers. These groups may not use CourseConnect directly but could still be impacted by how it influences social dynamics on campus.

As we iterated through our design, we identified a couple of value tensions, namely:

- **Freedom vs. Moderation**
  - **Freedom:** An unmoderated "open forum" feature invites freedom and diverse conversation, which encourages more authentic conversation, but may also lead to inappropriate content or harassment.
  - **Moderation:** On the other hand, while actively moderated discussions can help create a safer, more respectful environment, they may also cause users to feel restricted, promote self-censorship, and discourage them from posting.
  - **Solution:** The solution was a hands-off, user feedback focused moderation tactic, giving users the option to flag or report content that they find inappropriate, which would then be subject to moderation and removal.
- **Inclusion vs. Popularity Bias**
  - **Popularity Bias:** Some user posts may receive a lot of attention while others may go unnoticed. Showing popular posts to a larger student base may encourage more interaction but may also make other students feel afraid to post out of fear that their posts would be overshadowed.
  - **Solution:** Our solution is to display a small number of "recommended" recent posts on the home page, while leaving the open forum in each individual class sorted by recency. This way, all posts have a chance to be seen, but there is also a way for relevant posts to be highlighted, increasing engagement. As for engagement metrics, we chose to keep likes but remove the option for dislikes, which promotes positivity and encouragement.
- **Inclusion:** By prioritizing equal opportunity for participation and visibility regardless of how well a post does and getting rid of engagement metrics may support users who want to be seen and heard. However, it would mean that recommended posts are not as relevant or engaging.

3 Limitations

While our design process led to a viable solution, there are several areas that we could have improved on and would do differently if we were to try again.

First, our data collection process could have benefited from a broader, more targeted outreach. While we interviewed students of varying ages and majors, we did not particularly target a certain demographic group. For example, the experience of belongingness on campus might differ from student to student for those who studied abroad, commute to and from university, are part of certain student organizations versus not, or are part of marginalized groups. This could help us gather more representative insights and direct us in a direction that could support a larger audience.

Second, we could improve on our early ideation sessions. Early on, our team gravitated towards ideas that centered around on-campus university efforts and opportunities, which may have limited our creativity. Belongingness is not always found through campus initiatives, and there are many other aspects we could have focused on to encourage socialization. If we could redo our ideation sessions, we would incorporate more divergent thinking exercises to encourage out-of-the-box ideas. We would also find inspiration from unrelated platforms to discover potential unconventional solutions to a lack of belongingness.

Finally, when conducting usability testing, we focused mostly on usability in terms of feature feedback, which is important but not everything. In the future, we would focus more on users' emotional experiences with the platform, which is not only key to keeping them engaged, but is also highly important as belonginess itself is inherently emotional.

CONCLUSION

A sense of belonging is foundational to students' well-being and ability to thrive in a university environment. Over the course of our research and design process, we sought to understand the nuanced ways Northeastern students experience belongingness and how digital tools might support or hinder this process. Through qualitative interviews, persona development, ideation, and iterative prototyping, we identified that many students, especially

those adjusting to post-pandemic, struggle to build meaningful relationships in academic settings. Our final design, NUConnect, reflects an intentional approach to digital belongingness. Rather than forcing interaction, it invites connection by providing accessible and customizable features that promote autonomy, comfort, and shared experiences. The app centers academic environments as key spaces for community-building and provides students with the tools to bridge casual recognition into deeper connections. NUConnect demonstrates the potential of human-centered technology to support community formation in higher education. By prioritizing familiar design patterns, personalized interaction, and seamless usability, we hope to empower students to feel more seen, supported, and connected– both online and in person.

ACKNOWLEDGMENTS

Frances Peters – Method
Devyanshi Chandra – Introduction, Background, Conclusion
Olivia Li – Prototype
Jolin Huang – Prototype, Discussion

REFERENCES

1. Meade, Jill. "Mental Health Effects of the COVID-19 Pandemic on Children and Adolescents: A Review of the Current Research." Pediatric clinics of North America vol. 68,5 (2021): 945-959. doi:10.1016/j.pcl.2021.05.003
2. Pardede, Saga, and Velibor Bobo Kovač. "Distinguishing the Need to Belong and Sense of Belongingness: The Relation between Need to Belong and Personal Appraisals under Two Different Belongingness-Conditions." European journal of investigation in health, psychology and education vol. 13,2 331-344. 1 Feb. 2023, doi:10.3390/ejihpe13020025
3. Brandt, Lasse, et al. "The Effects of Social Isolation Stress and Discrimination on Mental Health." *Translational Psychiatry*, U.S. National Library of Medicine, 21 Sept. 2022, pmc.ncbi.nlm.nih.gov/articles/PMC9490697/.
4. Northeastern University. 2025. *Facts and Figures*. Retrieved April 16, 2025 from https://facts.northeastern.edu/
5. Yvonne Rogers, Helen Sharp, Jennifer Preece. 2023. Interaction Design: Beyond Human-Computer Interaction 6th Edition, Chapter 16: Evaluations: Inspections, Analytics, and Models.
6. Yvonne Rogers, Helen Sharp, Jennifer Preece. 2023. Interaction Design: Beyond Human-Computer Interaction 6th Edition, Chapter 5: Social Interaction
7. Herman Saksono. 2025. Module 3.1 - Cognition. Northeastern University, Boston, MA.
8. Herman Saksono. 2025. Module 11. Northeastern University, Boston, MA.
9. Cooper A, Reimann R, Cronin D, Noessel C. *About Face: The Essentials of Interaction Design*. 4th ed. Wiley; 2014:208.
10. Yoo Daisy, Alina Huldtgren, Jill Palzkill Woelfer, David G Hendry, and Batya Friedman. "A Value Sensitive Action-Reflection Model: Evolving a Co-Design Space with Stakeholder and Designer Prompts" In CHI 2013. Paris: ACM, 2013. Pg. 419.
11. Thomas Erickson, Christine Halverson, Wendy A. Kellogg, Mark Laff, Tracee Wolf. 2002. Social translucence: designing social infrastructures that make collective activity visible.

SUPPLEMENTARY MATERIALS

*Note: We received permission for Professor Saksono to use our low fidelity Figma prototypes as photos for the paper protypes because we had already submitted our copies of the paper prototypes.