Learning with your Buddies: an investigation of community based UX design learning on Discord

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Abstract

Online communities have been a major part of how people connect with others to learn about different perspectives. In this thesis, I examine ways people use Discord, one of the major online community platforms, to learn UX design.

In this research, I designed a study, collected data from the Design Buddies Discord, and conducted semantic content analysis to investigate the community learners, job seekers, and mentors' dialogues. I then used social network analysis to uncover patterns in connections. Lastly, I conducted a qualitative evaluation to survey and to understand the usefulness of Design Buddies.

The results show that a balance between topic-focused and social discussions is essential to creating a strong community centered around design. Mentors formed a micro-community around sharing knowledge and social discussions. Members of the study found useful resources, more about UX design as well as different fields of design beyond UX design, and social connections in Design Buddies.

Acknowledgement

I would like to thank Dr. Sharon Hsiao for advising me through my thesis and providing actionable feedback to help me improve. Dr. Hsiao helped me learn more about the field of research. She also helped me conduct a usability study in her Winter 2022 Web Usability class. I've learned about many different research methodologies and how to translate raw data into insights that I would also be applying to my career as a UX designer and in my collaborations with UX researchers.

I would like to thank Vincent Zhou for helping me compile my sentiment analysis data and advanced spreadsheet work. It was hard for me to use Python programming in order to do the analysis, so Vincent helped me tremendously in that area.

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1 Introduction

Online communities enable anyone across the world to connect with others to learn about different perspectives. Online communities have existed since 1985 [23]. Over the next 40 years, they have allowed anyone with access to the internet to connect, share knowledge, and help each other based on a common interest. In this paper, I examine and design ways of learning UX design through online communities. UX design has become one of the top 25 jobs in America in 2022 [14].

In community building platforms such as Discord, users may start a server with anyone on the internet based on their own topic. Discord offers text, voice, video, and screen sharing as a form of communication [1]. Each Discord server encompasses a community and can be segmented into different subtopics through channels. Each channel is a live chat, enabling people to converse and connect organically.

In this research, I examine how interactive learning in an online community leads to increased learning in UX design. Qualitatively, I conducted user research interviews and a usability study. Quantitatively, I utilized semantic analysis and social network analysis to investigate the content and the dialogues in the community. These are scalable approaches and give us data on the content and interactive learning within the community.

1.1. About Design Buddies

Design Buddies is a Discord community with 38,000+ members globally (as of May 2022). It offers events, mentorship, design workshops, design challenges, job recruiting, networking, portfolio reviews, social meetups, and more to facilitate community-based learning.

Design Buddies members are segmented into the demographics of students, professionals, hiring managers, recruiters, companies, and allies. Students are anyone learning design to land their first design full-time job. Students may include high school students, university students, and career-switchers who are currently professionals in a non-design field. Professionals range from early-career to CEO level. Some professionals also help answer students' questions and mentor them. Hiring managers and recruiters are professionals joining Design Buddies to find candidates to join their teams. Examples of companies are design tool companies, providing resources for the community. Allies are non-designers but interested to learn more about design or supporting designers.

1.2. Motivation

With the rise of UX design as one of the top 25 jobs in America according to Glassdoor [14], many different ways to learn UX design have come up. Today, people learn UX design in a variety of ways including a graduate degree, boot camps, courses, self-taught, and more. Most learning happens when there's a level of interactive activity by the learner [3]. Learning communities may drive interactive learning from learners and are typically free compared to university degrees and bootcamps.

Design Buddies is a learning-based community where people can self-teach themself UX design to land a job. Community-based learning has many advantages to learning UX design by providing an environment where interactive learning naturally occurs. Additionally, as the Design Buddies community is public, people from all over the world and at all levels of experience can provide input to learners. Design Buddies also has mentors, who are industry professionals with at least 1 year of experience who regularly answer learners (mentee)'s career-related questions and help them give feedback on their design work and portfolio.

Measuring learning in UX design requires domain expert judges, which is difficult to scale. Thus, our goal is to create an automated framework that identifies useful learning content in an open design discussion channel.

1.3. Assumptions and Hypothesis

It is assumed that community-based learning enhances learning in UX design as it follows the ICAP theory by creating an interactive learning environment [3].

Design Buddies Discord is a mix of an online discussion forum, an instant-messaging app, and a resource library. This makes Design Buddies different from other Discord communities where those communities are most similar to an instant-messaging app.

Discord provides an interactive learning environment that provides value to learners - it could be more useful and fun than other traditional learning platforms (eg. Camino/Canvas).

Design Buddies has an audience from all over the world. It is assumed that having a diverse global perspective can help drive more critical thinking and feedback on one's design work. This may lead to the advancement of one's design skills and network - both hard and soft skills needed to land a job in UX design.

Through my research, I examined how social connections and micro-communities can lead to learning and UX design job readiness through subjectivity and social network analysis through 4 specific learning channels in Design Buddies - #ask-mentors, #career-questions, #design-feedback, and #portfolio-feedback.

I assume that #ask-mentors is more subjective than #career-questions because in the channel name with "mentors," there could be more specific questions towards specific people whom are mentors in the Design Buddies community. I also assume that in #ask-mentors and #career-questions, there are more connections made between users compared to #design-feedback and #portfolio-feedback because people have more social conversations in #ask-mentors and #career-questions.

I assume that the subjectivities between #design-feedback and #portfolio-feedback are similar because the use cases are similar - people go there to get feedback on their work from other community members. I also assume that in those channels, there may be a less sense of a community in terms of connections per person compared to #ask-mentors and #career-questions

1.4 Research Questions

1. What kind of discussion formats helps increase the engagement and the strength of the individual members within a community centered around a topic (design)?
2. Can comment semantics determine how well members of a community can make connections?
3. What is the role of mentors in learning UI/UX design on Discord? Do they form a micro-community around them?

1.5 Contribution

Overall, I found that a balance between design-related and non-design-related discussions are both essential to creating a strong community where members can improve their skills and make new connections.

I started by doing a literature review on topics about general learning online and how online learning is measured.

On the experimentation side, I collected a balance of both qualitative and quantitative feedback via a usability study, semantic content analysis, and social network analysis. The usability study was run with Dr. Hsiao's Winter 2022 Web Usability class. The semantic content analysis and social network analysis was run in the 4 main channels where most interactive learning takes place in Design Buddies - #ask-mentors, #career-questions, #design-feedback, and #portfolio-feedback.

I also founded the Design Buddies community on April 10th, 2020. As of May 2022, we have 38,000+ members on Discord and an audience of nearly 100,000 across all of our channels. I

also helped form some teams to help make all of this possible - admin, community, events, product design, content, graphic design, and public relations.

2 Literature Review

2.1. Online Learning

The literature review section covers topics ranging from learning online (3.1) to how online learning is measured (data analysis, 3.2)

2.1.1 State of UX Design Learning in 2022

With the rise of UX design as one of the top 25 jobs in America according to Glassdoor [14], many different ways to learn UX design have come up. UX design has also become a more popular freelancing job [13].

With the COVID-19 pandemic, these methods of learning have shifted from in-person and expensive to remote and self-guided, which is more accessible. Those formats include online communities, bootcamps, YouTube playlists, email-based courses, self-guided classes, content by UX design content creators, and more. Due to the increasing job demands, many online UX design learning resources do not go through the entire end-to-end product development process in the real world and only scratch the surface of UX design [13].

2.1.2 Learning theories

The ICAP learning theory proves that the more students are engaged with the learning material, the more they retain what they are learning. Specifically, as students become more engaged with learning materials they go from passive -> active -> constructive -> interactive. It has been proven that learning improves 8-10% across each mode. Outcomes are measured based on how the students receive the learning material. ICAP has validated that interactive learning most increases learning retention [9], and online communities may serve as an interactive learning environment.

In passive learning, learners are receiving info without taking any action. It is still possible to deeply process information. Examples of passive learning include listening to a lecture, reading a text, or observing a video without doing anything else. Knowledge is stored isolatedly and is inert. It can only be retrieved with a specific cue (eg. exam) [3].

In active learning, some physical movements are being taken. Examples of active learning include repeating, taking notes word for word, highlighting, and adjusting video (pause, speed up, etc). It can be used to fill gaps in knowledge. Active learning has been validated to have better learning performance than passive learning [3]. Additionally, it has been validated that Students with active learning behaviors had more learning gains than students who didn't show active learning gains in a study done with MOOCs [15].

In constructive learning, learners generate additional outputs. It is generative and includes new ideas beyond a yes or no response. Examples of constructive learning include reading text out loud, drawing concept maps, asking questions, self-explaining, and comparing and contrasting to other knowledge. Processes of inferring (induce, deduce, abduce) take place. Constructive learning facilitates deep understanding and a potential for the learner to teach someone else the material [3].

Interactive learning involves at least 2 partners which can be human to human, or human to computer. Both partners must have constructive responses and take turns to generate some knowledge that's beyond the learning material. Examples of interactive learning include debating with a peer, giving feedback, answering comprehension questions with a partner, and defending and arguing for a position. Both parties benefit from the learning in interactive learning. Interactive learning facilitates the deepest understanding and holds the potential to innovate new ideas [9]. In this thesis, I have studied interactive learning.

ICAP can be used as a guide for instructional design for both in-person and online learning. It measures engagement behaviors from the learner's perspective. An example activity is a passive lecture along with a guided activity (eg. worksheet), followed by a constructive activity by

prompting students to make a concept map, then an interactive activity for students to finish incomplete tasks that they didn't know the answers to [3].

2.1.3 Online learning content

There are a lot of online learning available in the form of courses, bootcamps, articles, videos, journals and more. Online learning is accessible as anyone with the internet may access the learning materials. Additionally, the adaption of online education sped up due to the COVID-19 pandemic [12].

The problem with online learning content is that it's hard to find the right resources due to the number of available resources, and it's hard to engage with the content to learn. Additionally, there is a lack of social support & accountability [5].

Online learning content is commonly associated with Massive Open Online Courses (MOOCs) that are large-scale and asynchronous [15].

In a study done by [15], Content relating to daily life and social experience is associated with higher-order thinking behaviors. The real-world examples help drive intrinsic motivation. Examples of how this could play out are by adding real-life stories to the content and encouraging collaborative tasks that require the students to connect learning concepts to their personal lives. On the other hand, concepts with more technical terms lead to cognitively poorer discussion. People have less to relate to and understand [15].

2.1.4 Group learning online

An advantage of online learning is that geographical barriers are removed, and students may connect with people from all over the world. This is motivational for students as the online environment unlocks them a world view [2].

In a group learning study conducted by Hsiao, Bakalovb, Brusilovskya, and König-Ries, it has been validated in a classroom study that the top students provided implicit social navigation support for the rest of the class. The students access learning content through peers' models

instead of their own. This encourages social guidance as it encourages exploring topics already solved by peers. Knowledge-based and social navigation support also helped students answer questions more correctly and increased their engagement. The engagement was measured based on how much time students spent on self-assessment questions and attempting to increase their scores. Additionally, students with a better understanding of the topic helped other students who didn't have as good of an understanding [5].

In MOOCs, it has been found that on-topic discussions have led to more learning than off-topic discussions. Off-topic conversations may not be useful for learning, but when using it to relate them with personal connections to the learning material, they could become useful for learning [15].

Many variables also influence students' higher-order thinking behaviors in online discussions such as the presence of an instructor and discussion questions [21]. This is also influenced by the student's intrinsic motivation, prior knowledge, and interest in the topic. For example, the students with higher prior knowledge may feel bored, while the students with lower prior knowledge may feel interested in contributing to the discussion [15].

Additionally, studies have proven that students prefer to work with tutors who are polite in online settings. However, if tutors are excessively polite, it would have negative effects on the student's learning process as the tutor spends more time working on polite expressions which hinders the learning process. Students with higher prior knowledge also prefer tutors to be more direct [17].

Also, to build a friendly relationship between tutors and students, the tutor can provide more positive feedback when the student is correct. Providing polite and open questions (eg. "What do you think we could try next?") also helps strengthen the friendly relationship. Negative feedback also helps the student to identify errors (e.g., "No, it is wrong") [17].

2.1.5 Communities

A community is an environment of people with shared interests with a purpose online or offline. A well-run community is where information flows smoothly (transparency), people can be

trusted (follow up with promises), property rights are protected, and is well-moderated. A sense of belonging motivates people to keep coming back to the community because they feel like they belong. Stories are also the foundation of communication within the community and how members learn from past experiences [6].

The social economics of a community may also be measured by social capital - a collection of positive interactions between multiple people. Social capital takes the form of kudos, respect, trust, celebrity, influence, greatness, and more. It also has ripple effects across the community. They help strengthen it by creating a sense of belonging and creating a positive environment [4].

Diversity also adds value to a community. Diversity can be composed of members with different skills, cultures, perspectives, attitudes, and experiences. It's also important to have a low barrier of entry to attract new and diverse members [6].

Communities are also composed of teams or archetypes as building blocks that collaborate together in different ways [6]. Examples are a group of writers who can collaborate together.

Some important features to have in a community are broadcasting, feedback, and collaboration [4]. Social media, newsletters, and announcements are often used for broadcasting. Feedback from community members helps community leaders define the direction and further features of the community to improve. Communities also encourage members to collaborate and support each other.

2.1.6 Community governance

Moderation is essential in all communities to keep the community safe. Moderation includes building infrastructure, user safety, events, direction, and community leadership. In Discord specifically, infrastructure is defined as roles, channels, and rules [7]. The goal of moderation is to facilitate a positive and welcoming community and avoid harmful rhetoric. If rules are broken, the member could face consequences such as being warned, muted, or banned.

The health of a community may be measured based on how members converse with each other about if they complain about the server if they feel included, and if they are aware of the rules [7]. A healthy community also has a structured moderation system were triggering and controversial topics are kept at a minimum or not allowed. Additional topics that may not be allowed also depend on the target audience, topic, and the goal of the community.

2.1.7 Collaborative learning

Group learning can facilitate collaborative learning where learners work together to achieve a common goal leading to improved learning outcomes through knowledge-constructive interactions [10]. The online collaboration uses tools such as asynchronous discussion forums and synchronous instant messages. In past studies, it has also been proven that discussion can facilitate learning in CSCL (computer-supported collaborative learning) [15]

Discussion forums are used for knowledge construction. They have been validated to improve students' performance and satisfaction by participating in forums on a study done by…… The online forum structure also promotes between-group communications as well as more knowledge sharing interactions [10]

Discussion boards are best for async as it takes time to process info thoroughly. Async helps learners process info at their own pace [11].

Instant messaging apps are better at promoting social interaction compared to discussion forums. They have also been validated to improve learning in science, math, and reading in a study done by…. The instant messaging platform helps reinforce within-group social bonds. Instant messaging apps could engage students in collaborative-learning both socially and cognitively [10].

However, higher social interaction is correlated with lower knowledge construction. Instant messaging apps could be good to facilitate team building once they are familiar with each other [10].

The Design Buddies Discord is a hybrid between a discussion forum and instant messaging app. This is done through a Q&A format in the channel structure supported by threads, and the instant messaging nature of the Discord platform.

2.2 Data Analysis

2.2.1 Different ways online group learning are measured

There are many methods to measure group learning including sentiment analysis classroom studies, concept mapping, self-explaining, interviews, clickstream data analysis, and social network analysis. In this thesis, I focus on sentiment content analysis, social network analysis, surveys, and user studies.

2.2.2 Sentiment analysis

Sentiment analysis uses natural language processing to study and classify subjective information. It can be used to mine large-scale social media data and segment opinions to detect trends, assist decision-making, and discover spam reviews. Tools such as SentiWordNet3 may be used to conduct sentiment analysis [8]. In my study, sentiment analysis was used to compare the general sentiment across different channels with different user norms and use cases.

2.2.3 Social network analysis

Social network analysis helps visualize participants' communication activities over time. It helps determine changes in their activities as well as patterns in relationships [10].

Social network analysis can also be used to see network density and cliques. Network density is the quantity of communication between participants. Cliques are subsets within networks where individuals engage more frequently compared to outsiders [10].

2.2.4 How is social learning measured?

Online discussion forums are places where learners often ask for help. There is a lot of information, but can be hard to search and navigate. The Design Buddies Discord may be compared to an online discussion forum. The advantages of using such platforms are

collaboration and communication. Multiple solutions are shown to learners who are comparing and contrasting to identify what's most important in the problem and also identify good and bad examples [9].

Based on a study done using Stack Overflow, a global (diverse) perspective is more constructive compared to a local perspective. The quality of the content is measured by the number of upvotes by the open community. The community considers diverse information as higher quality. Also, asking good questions leads to higher-quality answers. Overall, the diverse answers section generally has higher quality than the controversial [8].

Additionally, topics related to the learning content containing more real-world examples lead to richer discussions. These topics include more social-oriented terms and less technical terms [15].

2.2.5 How Discord is used in social online learning

Discord is a useful platform for learning due to its accessibility, fast onboarding, support for both synchronous and asynchronous conversations, clean interface, social features, and governance features. It has been validated as a tool for online learning in a study conducted by [2].

Discord is an accessible platform - a free lightweight application available on Windows, macOS, Android, iOS, Android, and browsers. It can be accessed through the web or application, and it just takes one click to join a server. These invite links may be embedded on a website, shared online, or via a one-click share through direct messaging. Discord is also available in 28 different languages and may be customized through visuals (icon, banner, and role colors), bots, and the Discord API [4].

Discord supports multiple communication formats to facilitate both synchronous and asynchronous conversations - text, voice, video, and screen sharing [1]. Servers have channels, which are visually separated into different groups and topics. These channels can be either text or voice/video/screen share type channels. Text channels support message pinning to help highlight important information. Any user may also start live broadcasts on Discord which creates an environment for live feedback via text and voice chat.

How Discord is further distinct from other video conferencing tools is that multiple people may screen share. This creates an optimal environment for learning as teachers can help multiple students at a time. Students in the same call can also help each other out in real-time. This increases the number of active students, creating an environment where interactive learning is encouraged. During interactive learning, students retain the most amount of information [3].

Discord has features to create an orderly system for server governance. Each channel may have its own access rights, to help create spaces where teachers may communicate with each other, and other channels where students may communicate with each other [22]. Discord also comes with a native audit journal for moderation and supports external bots for moderation to display the actions of each user on the server through time [1]. Additionally, admins may mute certain users in both text and voice chats if they are being disruptive or causing other problems.

3 Methodology

3.1 Literature search

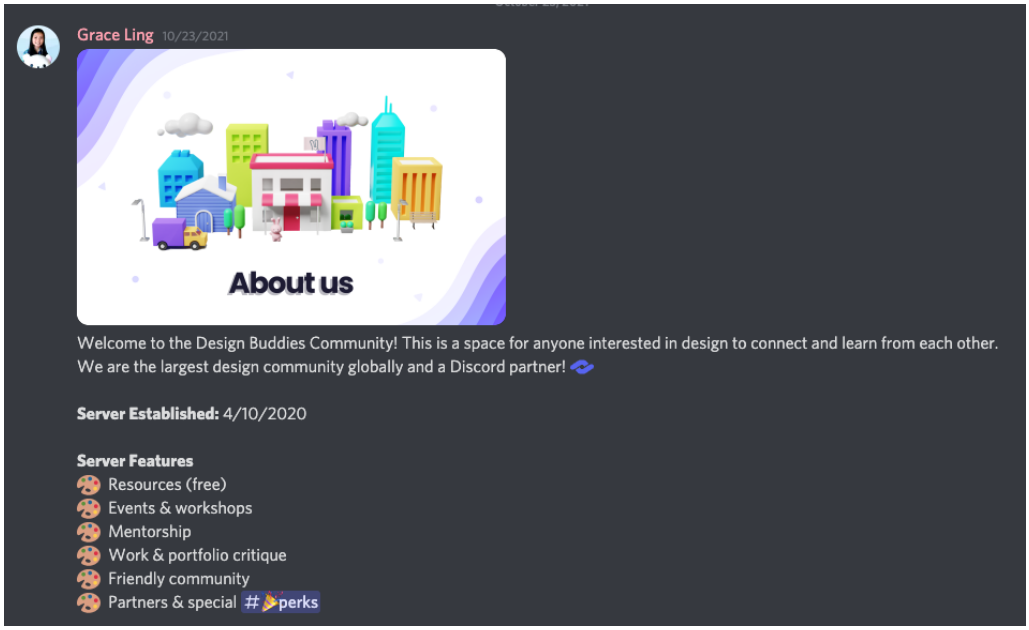
The goal of the literature search is to find information about how online communities are used in relation to learning. Various topics ranging from learning theories, how online learning is measured, social network analysis, semantic analysis, and more were studied. Literature from academic journals, community-building books, industry news, and more were sources.

3.2 Tools used

We specifically chose sentiment analysis and social network analysis out of all the ways we can measure online UX design learning because they are scalable and give us data on the content and interactions within our community.

3.2.1 Discord, social features

Figure 1
Design Buddies home channel on Discord, #about-and-links



Discord has text chat, voice chat, replies, threads, reactions, and roles to facilitate social features in Design Buddies. Design Buddies additionally has design feedback channels, channels where members can get detailed career advice.

Design Buddies' main user bases that all interact with each other include students (undergraduate, graduate, and design bootcamp), professionals (entry level to CEO, includes mentors), companies (hiring managers, marketing), and allies (non-designers interested in learning more about design. Examples include product managers and software engineers). In my thesis, I mainly focus on students and mentors.

On the events side, Design Buddies hosts an average of 2 events per week ranging from interactive design workshops, ask-me-anything style panels with industry experts, keynotes, portfolio reviews, design challenges, and social gatherings.

3.2.2 Discord, channel content

The text-based channels **#ask-mentors**, **#career-questions, #design-feedback, and #portfolio-feedback** were examined in my thesis. In all of these channels, users may engage via text, emoji reactions, and sharing media (images, videos, and external links). Topics relating to the end goal of landing a job or getting promoted in the field of UX design takes place.

The channels, #ask-mentors and #career-questions typically have a few conversations going on with many regular participants. Anyone is welcome to reply, but there are some regular active mentors who often reply to the majority of the student's questions there. Often, the conversations organically evolve into topics outside of design and people get to know each other better.

The channels #design-feedback and #portfolio-feedback typically have one-off conversations. Often, a student posts a piece of work for feedback, and anyone else from the community (not just mentors) can respond.

3.3 Sentiment analysis

Sentiment analysis was conducted to find the overall sentiment (positive, negative, and neutral) in the channels **#ask-mentors**, **#career-questions, #design-feedback, and #portfolio-feedback** ranging from June 2020 to November 2021 using text mining technique. The subjectivity lexicon was used to analyze the text to identify strong and weak subjective words [27].

To collect data for my sentiment content analysis and social network analysis, I collected chats spanning from June 2020 to October 2021 in the 4 channels in that time duration using the Chrome plugin, Discord Chat Saver - Export chat log to Xlsx [18]. The individual chats were then evaluated on strong subjectivity, weak subjectivity, and total subjectivity.

To determine the total subjectivity across the 4 channels, the mean, standard deviations, and t-test was calculated. The mean and standard deviations indicate which channels have more subjective conversations. The standard deviation tells me which ones have more variance. The T-test shows whether 2 averages are significantly different.

To determine each individual's subjectivity across the 4 different channels, the correlation coefficient was calculated. The correlation coefficients between #ask-mentors and #career-questions as well as #design-feedback and #portfolio-feedback were compared.

The results of this are detailed in the Evaluation section.

3.4 Social network analysis

Social network analysis helps see the magnitude of connections between individuals in Design Buddies. It's a graph-based way to visualize the number and strength of connections between individuals in a community. It helps define patterns in relationships [20].

In Design Buddies, social network analysis is used to define mentor and mentee relationships in Discord to examine the relationship between high amount of mentor-mentee dialogue and how the mentee lands a job in UX design.

Each channel (#ask-mentors, #career-questions, #design-feedback, and #portfolio-feedback) were run through Gephi [19]. Gephi is an open-source graph visualization platform. I compared the number of edges and nodes between the 4 channels. Nodes are the number of users, and edges are the number of their conversations. Directed graphs are created based on the frequency of the conversations between any two members in the communities.

I also examined average degree centrality, modularity, and eigenvector centrality. Degree centrality is the number of edges of a node. The more degrees a node has, the higher it's centrality is [24]. Modularity measures network structure - the higher the modularity, the denser the connections are [25]. Eigenvector centrality measures the level of influence of a node within a network, taking into account the number of connections that node has with another node [26]. Average clustering coefficient is a measure of network density - the higher the value, the denser the connections are (when people know each other well) [27]. These network metrics allow to interpret the community connectivity and to understand mentors and mentees relations on Discord.

To look at the number of subcommunities, I took the top 10 members with the highest degrees and examined their edges.

3.5 Usability Study

I designed a usability study for 16 students at Santa Clara University's Winter 2022 Web Usability class taught by Dr. Sharon Hsiao. The classroom study instructions are detailed in the appendix.

3.6 Surveys

In our survey following our usability study, I asked questions about usefulness, ease of use, and social connections. A list of all of the questions can be found in the appendix.

Our survey results are detailed in section 5d.

4 Evaluation

4.1 Overall Findings

Overall, a balance between design-related and non-design-related discussions are both essential to creating a strong community where members can improve their skills and make new connections.

On subjectivity, I found that #career-questions are more subjective than #ask-mentors when looking at the total subjectivity (Table 1). Individuals additionally have a divergent tone of subjectivity between the two channels (Table 3), suggesting that the use cases of both channels may be different. Also, #portfolio-feedback is more subjective than #design-feedback when looking at the total subjectivity (Table 1). Individually additionally do not have a divergent tone of subjectivity between the two channels (Table 3), suggesting that the feedback provided by individuals across both channels is typically consistent.

On social network analysis, I found that #ask-mentors and #career-questions are more of a place for social discussions on top of Q&A where all most of participants of the conversation contribute. More mentors are also active in these two channels. In #design-feedback and #portfolio-feedback, members mainly come for one-off feedback, resulting in more fragmented conversations instead of one central conversation going on.

On my usability study, I found that the students didn't associate Discord as a learning platform but still saw it as a place to find useful resources to learn more about UX design. A few also felt intimidated or scared to ask for help and make connections in Design Buddies and how there are too many channels, which may have impacted the perceived usefulness of Design Buddies as a learning platform.

4.2 Sentiment analysis results

4.2.1 Overall subjectivity

The #career-questions channel (M=25.853, SD=32.467) had significant higher subjectivity than #ask-mentors channel (M=20.550, SD=28.057) ($p<0.01$) (Table 1, 2). This shows that when users ask career questions, it's significantly more subjective than asking mentors.

My hypothesis was proven wrong. I assumed that #ask-mentors is more subjective than #career-questions because in the channel name with "mentors," there could be more specific questions towards specific people whom are mentors in the Design Buddies community. The data suggests that the questions for mentors are more neutral. People's individual experiences with their careers are unique, which could have led to the higher subjectivity in #career-questions.

Looking at the social network analysis of #ask-mentors (Table 4), there is highest number of individuals and conversations taking place in this channel looking at the number of nodes and edges. Additionally, it has the highest average degree and clustering coefficient as well. It could lead to higher subjectivity with more opinions and perspectives being shared.

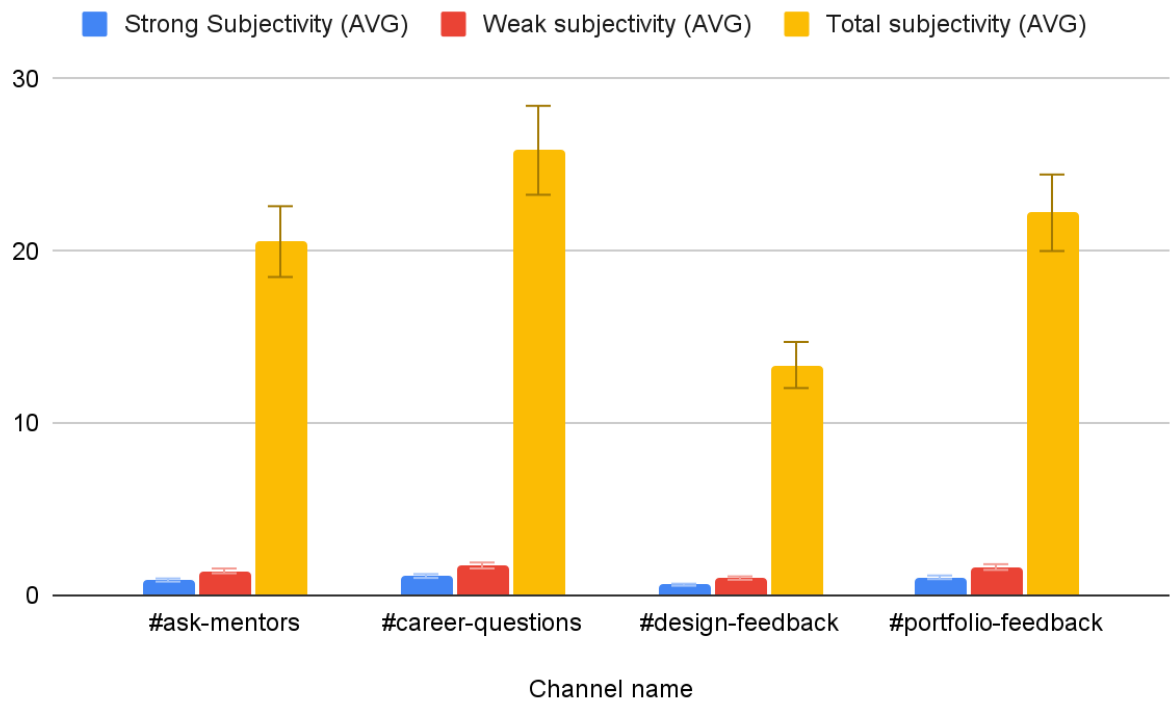
As UX design is relatively new, there may not be a consistent way to hire. This may explain why #career-question is more subjective with more anecdotes based people's on personal experiences.

#portfolio-feedback channel (M=13.380, SD=18.337) had significant higher subjectivity than #design-feedback channel (M=22.225, SD=30.701) ($p<0.01$) (Table 1, 2). This shows that when user asks for feedback on their portfolio, the responses are more subjective than asking for

feedback on general designs. This could be because portfolios are typically targeted toward the goal of landing a job in design.

Table 1

Subjectivities of channels



Channel name	**Strong Subjectivity (AVG±SD)**	**Weak subjectivity (AVG±SD)**	**Total subjectivity (AVG±SD)**
#ask-mentors	0.892±1.477	1.424±2.249	20.550±28.057
#career-questions	1.127±1.725	1.735±2.502	25.853±32.467
#design-feedback	0.619±1.038	1.005±1.729	13.380±18.337
#portfolio-feedback	1.050±1.721	1.645±2.620	22.225±30.701

T test Results

Table 2

Channel names	**P values**
#ask-mentors vs. #career-questions	3.94E-16 (<0.01)
#design-feedback vs. #portfolio-feedback	7.37E-08 (<0.01)

4.2.2 Individual subjectivities

With the correlation coefficients, I examine the subjectivities of individuals across the 4 different channels.

The total subjectivities of #ask-mentors and #career-questions are 12.7% different from each other (Table 3). This is significant. In #ask-mentors and #career-questions, people have a divergent tone of subjectivity suggesting a different use case for the two channels. In these channels, the questions are typically more targetted towards specific individuals hence the significantly different subjectivities.

The total subjectivities of #design-feedback and #portfolio-feedback are 1% different (Table 3). This shows no significant divergence. This shows that the feedback provided by individuals across both channels is typically consistent, which is consistent with my hypothesis

Table 3

Correlation coefficients

Channel names	**Correlation coefficients**
#ask-mentors vs. #career-questions	-0.127
#design-feedback vs. #portfolio-feedback	0.013

4.3 Social network analysis results

Each channel (#ask-mentors, #career-questions, #design-feedback, and #portfolio-feedback) were run through Gephi [19]. Gephi is an open-source graph visualization platform.

4.3.1 Statistics

Table 4

Social network analysis data

Channel name	**Nodes**	**Edges**	**Average Degree**	**Modularity**	**Average Clustering Coefficient**
#ask-mentors	492	1433	2.913	0.48	0.318
#career-questions	296	765	2.584	0.487	0.281
#design-feedback	142	285	2.007	0.562	0.242
#portfolio-feedback	93	179	1.925	0.588	0.23

A directed graph was used. I compared the number of edges and nodes between the 4 channels (Table 4). The nodes represent the number of users and the edges represent the number of conversations. Comparing #ask-mentors and #career-questions, #ask-mentors has more edges. Career questions are more individualized. They are consulting someone influential in the community, typically a mentor.

The degree of a node is a number of connections. #ask-mentors has the highest number of average degrees (Table 4). #ask-mentors is the most social and interactive channel where conversations most commonly organically form, so this aligns with my hypothesis. The feedback channels have the lowest number of degrees. Users typically come here for one-off feedback on their design or portfolio work, so this also aligns with my hypothesis.

Degree centrality is the number of edges of a node. The more degrees a node has, the higher it's centrality is [24]. This number can be seen as the average connections each user has in the channel. #ask-mentors has the highest average degree of 2.913 and #portfolio-feedback has the lowest average degree of 1.925 (Table 4). This means that the average user chatting in #ask-mentors has about 3 connections and the average user chatting in #portfolio-feedback has 2 connections. More people know each other in #ask-mentors and #career-questions compared to #design-feedback and #portfolio-feedback. In this case, knowing each other well is defined by the number of back and forth conversations users have with each other. The more back and forth conversations, the better they know each other.

Modularity measures network structure - the higher the modularity, the denser the connections are [25]. #portfolio-feedback has the highest modularity of 0.588 compared to #ask-mentors which has the lowest modularity of 0.48. Both #portfolio-feedback and #design-feedback have higher modularity compared to #career-questions and #ask-mentors (Table 4). This suggests that even though there are a lower number of connections made in #portfolio-feedback and #design-feedback, the connections made are stronger with more back and forth dialogue. There are # regular mentors who often provide feedback to the majority of members asking for feedback in those channels, so that has also contributed to higher modularity.

The average clustering coefficient is a measure of network density - the higher the value, the denser the connections are (when people know each other well) [27]. #ask-mentors has the highest average clustering coefficient (0.318) followed by #career-questions (0.281), #design-feedback (0.242), then #portfolio-feedback (0.23) (Table 4). This trend is consistent with the degree of centrality data. In addition to more people knowing each other, people know each other the most well in #ask-mentors and #career-questions compared to #design-feedback and #portfolio-feedback.

Overall, there appears to have a more tight-knit community in #ask-mentors and #career-questions compared to #design-feedback and #portfolio-feedback. More people know more people and know each other better. This aligns with my hypothesis of how #ask-mentors and #career-questions are more social, and in #design-feedback and #portfolio-feedback, people

typically go there for feedback on their work only, instead of conversing with others to get to know them more.

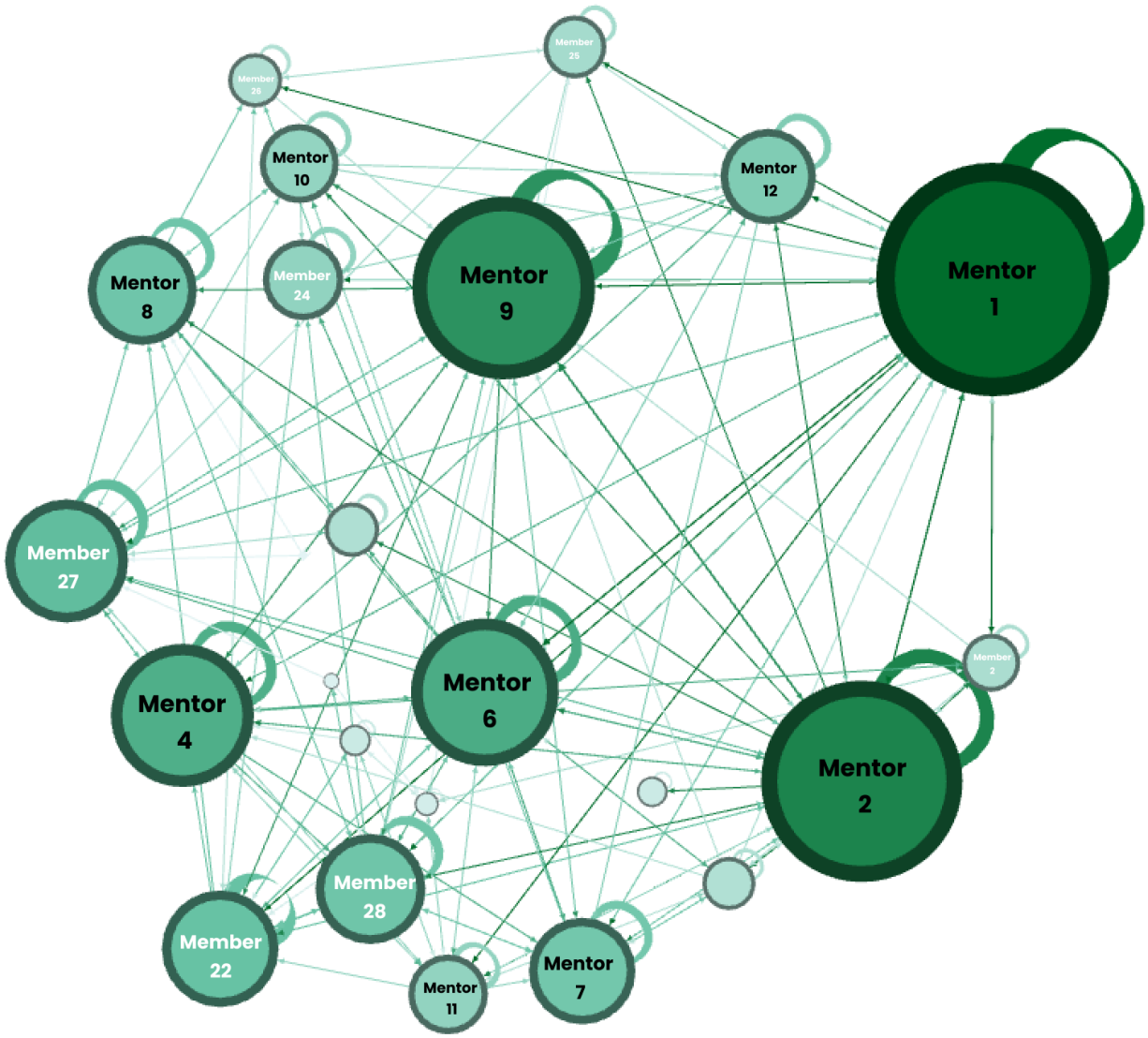
4.3.2 Graph data

On the social network analysis graphs, I labeled the people as “Mentor #” and “Member #” and they are the same people consistent across all 4 of the channels. Mentors are labeled in darker text, and members are labeled in lighter text to further help differentiate. Mentors are Design Buddies official mentors, and members are anyone in the community.

The loops back to oneself is the user replying to themselves, often adding more context to their reply. All of the graphs without filtering can be found in the appendix.

Figure 2

#ask-mentors social network analysis. Looking at the top 17 most active people, there appears to be more mentors (10) than members (7) present. The degree range has been adjusted to 18-153.



The most active people in #ask-mentors are mentors. The channel also has a balance of mentors and members regularly conversing with each other, forming a community within Design Buddies as a whole.

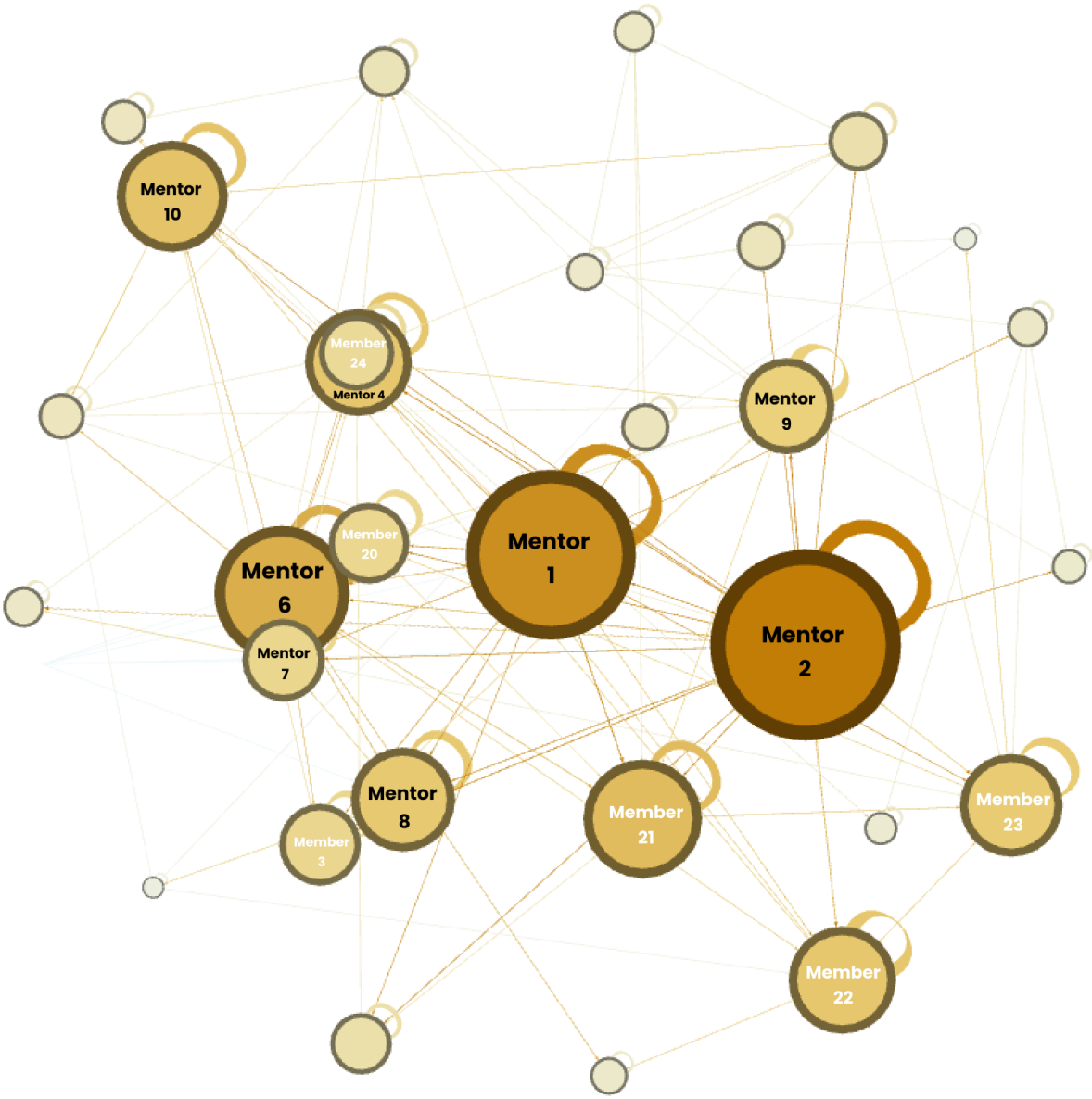
The total subjectivity in #ask-mentors is also lower than #career-questions (Table 1), and additionally, individuals who communicate in both #ask-mentors and #career-questions have a

divergent tone of subjectivity (Table 3). This suggests that with a higher number of people, there are more diverse opinions shared which lead to a slightly lower total subjectivity. The total subjectivity in #career-questions may be higher than #ask-mentors because people tend to ask more specific questions there. As UX design is a relatively new career field, people mainly share their own experiences about what specifically worked for them.

Mentors regularly answer members' design-related questions as well as chat with each other. Oftentimes, the conversation becomes non-design-related as the regular people in the channel get to know each other more. The results of the social network analysis and subjectivity analysis align to this.

#ask-mentors is also the 14th highest channel in Design Buddies in terms of number of readers. This is high, considering the fact that Design Buddies has 57 channels where all members can view. Most of the channels in Design Buddies also have their own micro community with different regular mentors and members conversing with each other.

Figure 3
#career-questions social network analysis. Looking at the top 14 most active people, there appears to be more mentors (8) than members (6) present. The degree range has been adjusted to 11-75.



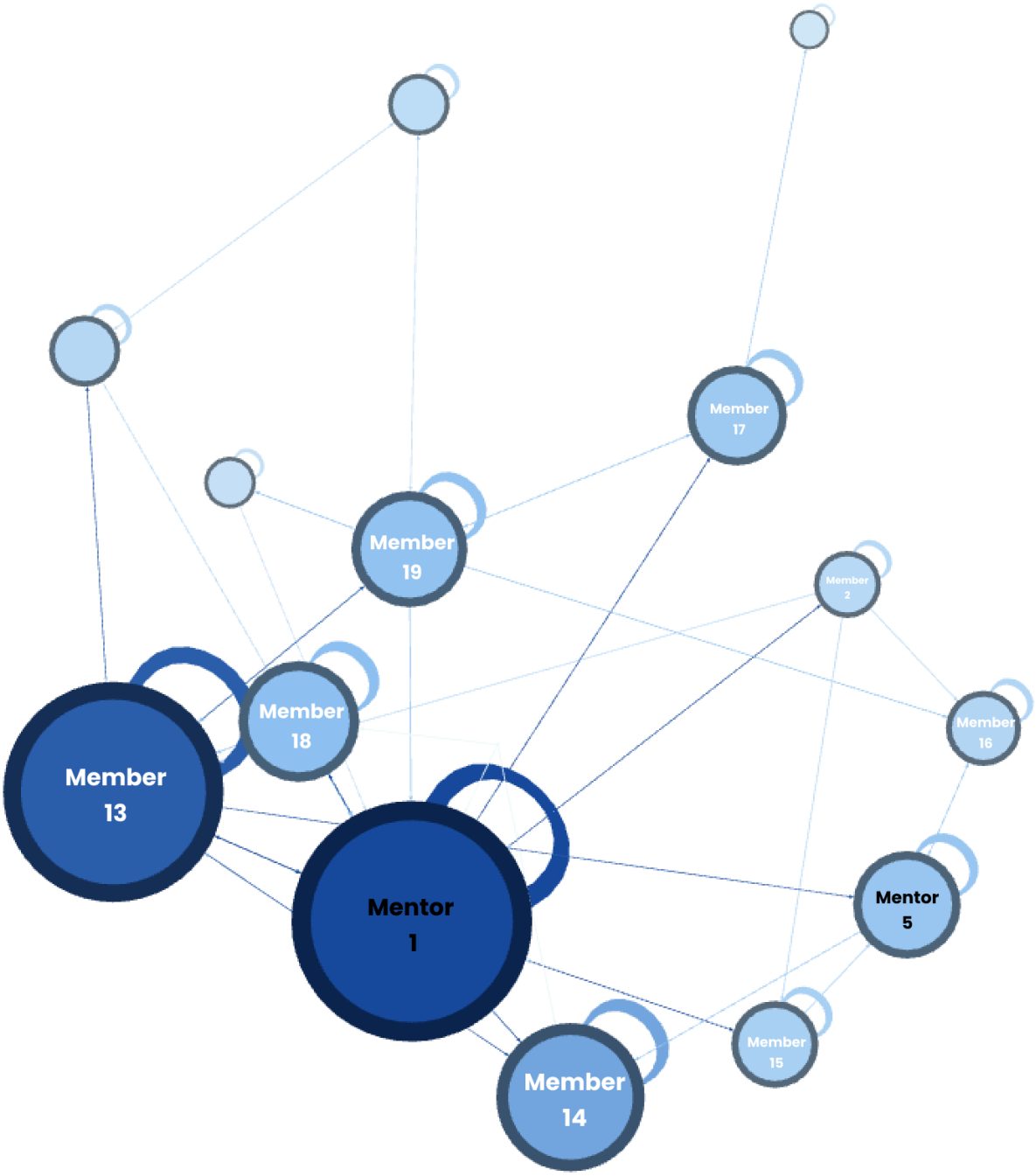
The most active people in #career-questions are also mentors. This makes sense as all members can come into this channel to ask design career-related questions, and these mentors regularly help answer them.

There are less edges in #career-questions compared to #ask-mentors. This suggests that there more one-off question-and-answer style conversation formats here compared to continued conversations over time with mentors.

#career-questions is also the 16th highest channel in Design Buddies in terms of number of readers. #career-questions and #ask-mentors are similar, but the main difference lies in the use case: #ask-mentors is mostly for career-related questions and social. #career-questions is mostly for career-related questions only.

Figure 4

#design-feedback social network analysis. Looking at the top 10 most active people, there appears to be much less mentors (2) than members (8) present. The degree range has been adjusted to 7-32.

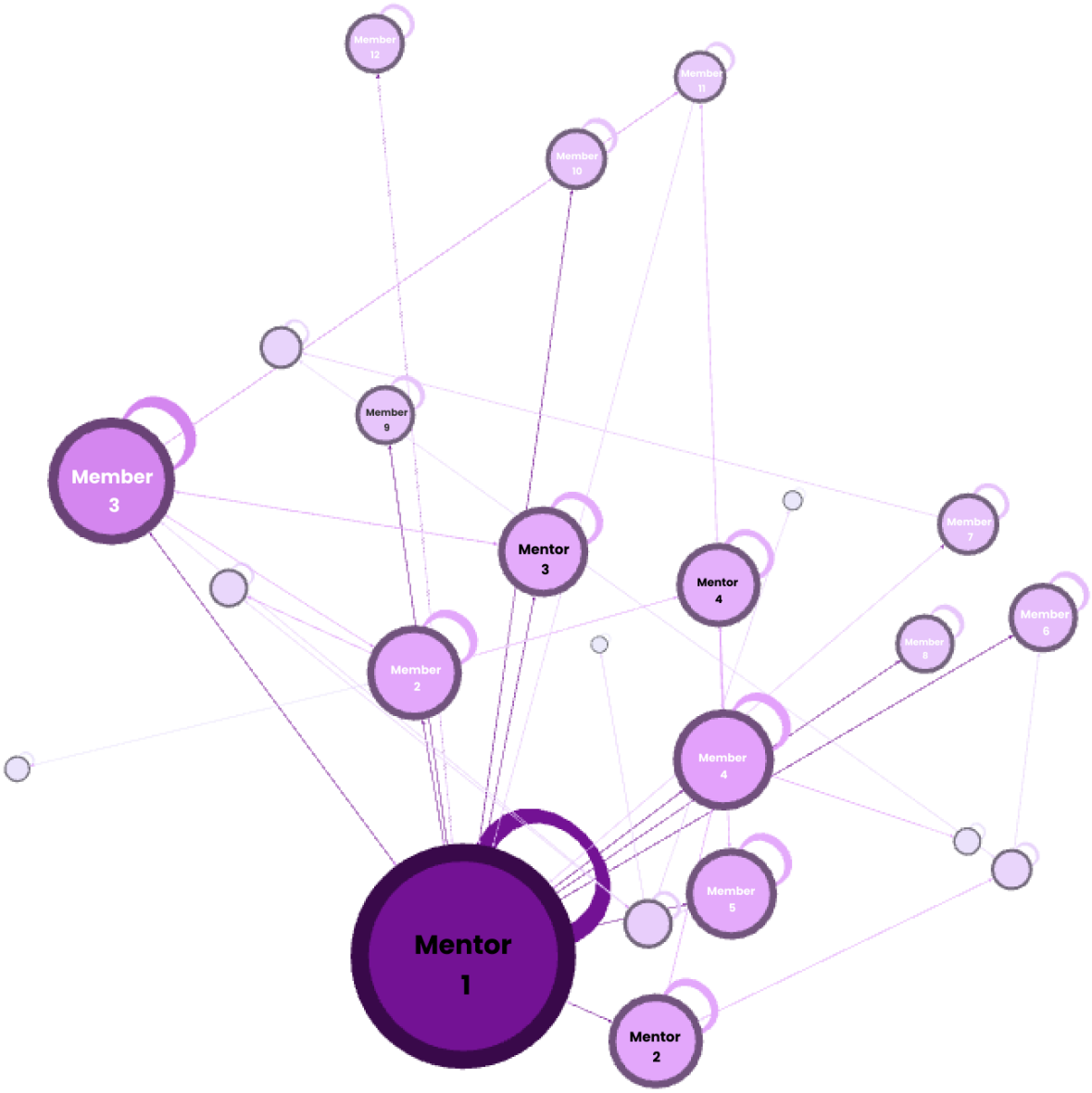


In #design-feedback and #portfolio-feedback, it's no longer that the mentors are the most active users anymore. In these channels, any member in the community can freely provide feedback on each other's work. Although there isn't an explicit rule saying that only mentors can reply in #ask-mentors and #career-questions, it trended towards that direction since #ask-mentors has "mentors" in it's name. The channel is also right on top of #career-questions on the channel order

list. #design-feedback and #portfolio-feedback are below, but nested in different suggestions (Figure 5). This suggests to the user that there may be different use cases for the 4 channels (perceived that regular members are also allowed to answer questions), although not explicitly stated in the Design Buddies' rules or channel guidelines.

Table 8

#portfolio-feedback social network analysis. Looking at the top 15 most active people, there appears to be much less mentors (4) than members (11) present.



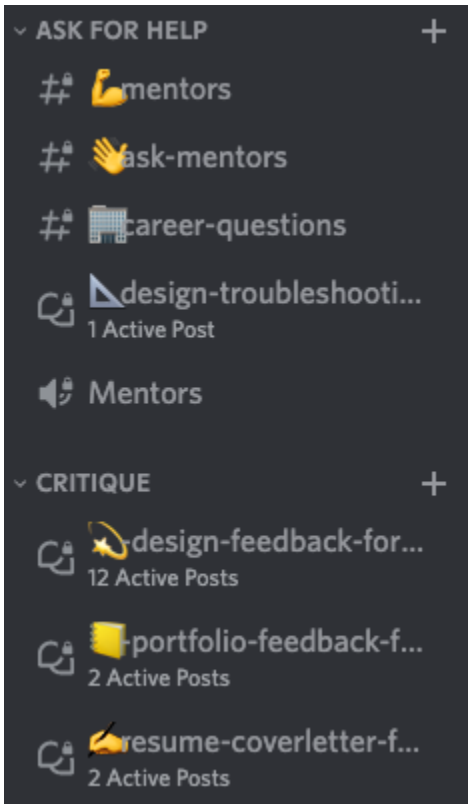
The degree range has been adjusted to 3-20.

#portfolio-feedback is similar to #design-feedback in a way that how the most active users are not all mentors. There are some more regular members who are mentors here. Anyone in both channels can post their work for feedback. #design-feedback focused on generic design feedback (for example, logo design, social media banner design, and more).

#portfolio-feedback focuses on feedback on a designer's portfolio - an essential piece for all design job applications. #portfolio-feedback is more career-focused compared to #design-feedback which is more generic.

Figure 5

Channel locations relative to each other of #ask-mentors, #career-questions, #design-feedback, and #portfolio-feedback



Overall, #ask-mentors and #career-questions has the most number of mentors contributing, and the higher number of messages compared to #design-feedback and #portfolio-feedback. #career-questions and #ask-mentors are similar, but the main difference lies in the use case: #ask-mentors is mostly for career-related questions and social. #career-questions is mostly for career-related questions only. #porfolio-feedback has more regular members who are mentors compared to #design-feedback. This makes sense as #portfolio-feedback is more career focused.

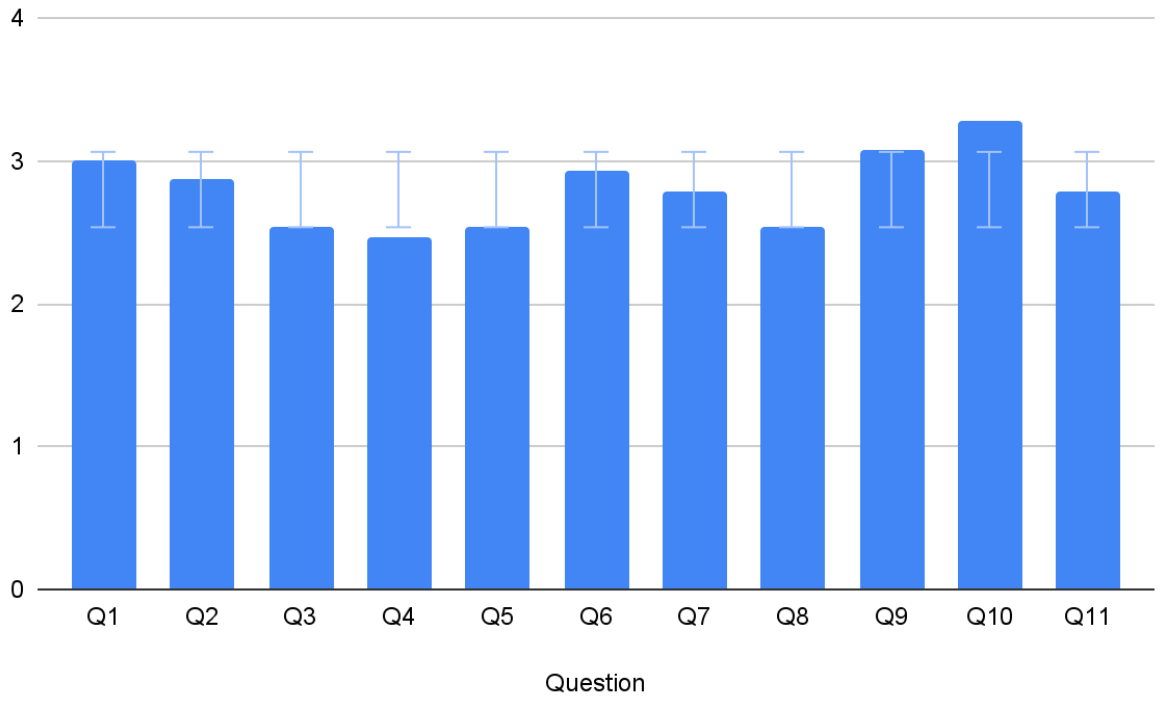
Mentor 1 is also the most active user of all. Mentor 1 is also the 8th most active user in the whole server based on the number of messages sent.

4.4 Subjective Evaluation (Survey Outcome)

After the usability study with the W2022 Web Usability class, a survey was conducted with the students. I asked questions about usefulness, ease of use, and social connections.

4.4.1 Findings/insights

Table 5
Survey results of the W2022 usability class study



Q1 is about the overall usefulness of Discord as a learning platform. Q2-Q5 are about the usefulness of individual channels - #ask-mentors, #career-questions, #design-feedback, and #portfolio-feedback. Q6-Q7 is about the usefulness of Design Buddies as a career and social discussion platform. Q8-Q11 is about the usability of Design Buddies - whether there are too many channels, how easy it is to find learning discussions, easy to connect, and the more anonymous nature of Discord.

Overall, the students didn't associate Discord as a learning platform. They were neutral on the usefulness of the channels - #ask-mentors, #career-questions, #design-feedback, and #portfolio-feedback. This may be due to the fact that many of them felt overwhelmed by the number of channels which may have impacted their usability and navigation. Despite that, some of them still made connections with others outside of Santa Clara University.

I have also accidentally reversed the scale order - I put (1 = strongly agree, 5 = strongly disagree) instead of the other way around. This may have impacted the results.

Members of the study found useful resources, more about UX design as well as different fields of design beyond UX design, and social connections in Design Buddies. For example, one member mentioned, “I learned more about the UX/UI industry field that I did not know much about before. As well as gaining some great connections.”

A few also felt intimidated or scared to ask for help and make connections in Design Buddies. For example, one member mentioned, “Many are open to helping but it's a little scary to ask for help.”

A few also felt like there were too many channels, and the Discord was overwhelming to new Discord users. However, the onboarding process for new users could be improved. For example, one member mentioned: “Design buddies is a great resource just hard to navigate for first-time Discord users. Maybe provide a more in-depth tutorial at discord before asking students to join just in case they are unfamiliar with the platform”

More results in detail can be found in the appendix.

5 Conclusion

Online communities have been around for nearly 40 years. Since then, they have allowed anyone with access to the internet to connect, share knowledge, and help each other based on a common interest. This paper examined ways of learning UX design through online communities via Discord, one of the most popular community building platforms.

In this research, I examine how interactive learning in an online community leads to increased learning in UX design. Qualitatively, I conducted user research interviews and a usability study. Quantitatively, I utilized semantic analysis and social network analysis. These are scalable approaches and give us data on the content and interactive learning within the community.

5.1 Lessons Learned

Overall, UX design is a relatively new field there may not be a consistent way to hire. Personal experiences with actionable insights may help new UX designers a glance on how to break into

the field. Feedback from professionals on one's design and portfolio work offer personalized insights on how to improve their craft and hard skills. Networking interactions in a social environment and collaborating with others helps one improve their soft skills, such as communication and teamwork.

I also learned that most students associate Discord as a social and gaming platform, and not a learning platform. However, this may be a good for students whom want to be more social and get to know others more on the platform with the dynamic chat. Also, as UX design is a relatively new career field, there may not be a consistent way to hire leaving room for more subjective and anecdotal advice.

It's also important to have places for both career-focused and social interactions in order to develop a strong community where members can gain skills and make new connections.

5.2 Limitations

On the survey, I did not include a question to collect names. Therefore, I did not have the data to track an individual user's survey response with their activity in the server. On the survey, I have also accidentally reversed the scale order - I put (1 = strongly agree, 5 = strongly disagree) instead of the other way around.

Many learning related discussions in Design Buddies also takes place via voice and video chat. In my study, I only examined the text chat.

I also could not find any previous research about learning specifically UX design using the Discord platform.

5.3 Future work

Design Buddies is evolving to become not only a learning community for design, but also a job matching community. There has been an influx of hiring managers and recruiters joining to share jobs. I could study the correlation between community based learning on Discord and how that could help people land a job in UX design. The reason why I'm interested in studying this is

because through our user feedback throughout the years, people's main motivation to join Design Buddies is to access resources and a network to ultimately land a job in UX design.

6 Appendix

6.1 Subjectivity Analysis

Channel names	**P values**
#ask-mentors vs. #career-questions	3.94E-16
#design-feedback vs. #portfolio-feedback	7.37E-08

6.1 Classroom study instructions

1. Join the Design Buddies Discord here. If you don't have a Discord account, it will prompt you to create one.
    a. Briefly introduce Discord.
    b. Introduce Design Buddies.
2. Add your Discord ID to this google sheet
3. When you join, you will only see 5 channels. Please head over to #rules-unlock-channels, read the rules, and then click on the Design Buddies reaction at the last message. After doing so, you should see 50+ channels
4. Assign yourself some roles in #role-assignment via clicking on the reactions
5. Introduce yourself in #introductions. You could include anything, such as what you're studying in, what you're interested in, hobbies, fun facts, and more. You can even connect with other people in the channel who share similar interests if you'd like.
6. (optional) Say hi or respond to a conversation in #general
7. Explore the Discord community, familiarize yourself with these channels: **#ask-mentors** and **#career-questions**, **#design-feedback, #portfolio-feedback,** and **#resume-coverletter-feedback**

8. Post at least one message a week from 2/11 to 3/11 and reply to people who answer you. These messages should be any career-related questions, questions related to the web usability class, one of your works that you'd like feedback on, or a response to someone else's reply.
    a. You can connect, get feedback, learn from industry professionals
    b. Conversations can be casual tone / outside school environment
    c. By engaging on Discord, you will get participant points for the course
9. On W9, a survey will open up. Please fill it out before W10.

Guidelines

1. You may feel overwhelmed by the number of channels in Design Buddies
2. You may ask for support for your assignments and feedback on your designs. You may not ask someone else to do your assignment.
3. You may use Design Buddies to ask for your career advice

6.2 Survey questions

Survey questions:

1. How useful did you find Discord as a learning platform compared to forums and messaging on Camino? (1 = strongly agree, 5 = strongly disagree)
2. How useful did you find the #ask-mentors channel? (1 = strongly agree, 5 = strongly disagree)
3. How useful did you find the #career-questions channel? (1 = strongly agree, 5 = strongly disagree)
4. How useful did you find the #design-feedback channel? (1 = strongly agree, 5 = strongly disagree)
5. How useful did you find the #portfolio-feedback channel? (1 = strongly agree, 5 = strongly disagree)
6. How useful did you find the general discussions on career topics in Design Buddies Discord (overall, no specific channel)? (1 = strongly agree, 5 = strongly disagree)
7. How useful did you find the general social discussions in Design Buddies Discord (overall, no specific channel)? (1 = strongly agree, 5 = strongly disagree)

8. Do you feel like there are too many channels in Design Buddies? (1 = strongly agree, 5 = strongly disagree)
9. Is it easy to find learning discussions in Design Buddies? (1 = strongly agree, 5 = strongly disagree)
10. Is it easy to connect with others in Design Buddies? (1 = strongly agree, 5 = strongly disagree)
11. I like the more anonymous feature of Discord (1 = strongly agree, 5 = strongly disagree)
12. How many people did you connect with outside of SCU?
13. Of those people you've connected with, how many are industry professionals
14. What did you learn in Design Buddies?
15. What else would you like to see in Design Buddies to help support your education?
16. Let us know if you have any additional feedback for us here. Also, if you would like to further chat about your feedback and experiences with Design Buddies, please leave your name and email below.

6.3 Survey results - qualitative

Question: What did you learn in Design Buddies?

1. Learned about different career paths within design/CS
2. I learned that there are a surprising amount of people willing to help and offer advice to strangers for nothing in return, which is pretty cool.
3. Nothing
4. Many are open to helping but it's a little scary to ask for help
5. I learnt how to network with people and get answers to anything related to Ui Ux.
6. I learned a lot about how communities of designers can help each other and give good advice related to projects and job searches
7. A lot about the industry of graphic and web design. I looked at a lot of websites from professionals but I was too scared to reach out lol.
8. We as designers/engineers/creators have so much potential to progress if we try to progress with our community. We can offer different experiences and different perspectives to our colleagues and that's something that i want to carry with me.
9. Paid opportunities and networking events

10. I learned more about the UX/UI industry field that I did not know much about before. As well as gaining some great connections.
11. I learned how useful it is to connect with others in your field, and how to use discord in general.
12. There are a lot of different specialties within the scope of digital design.
13. Lots of links to interesting things such as UI/UX studies.
14. I learned about current design techniques and trends in industry.
15. Through one of their workshops I learnt about minimalistic design and other design tools.

Question: What else would you like to see in Design Buddies to help support your education? (optional)

1. Can’t think of anything in particular
2. Links and reviews on online certificates and courses related to design
3. I really just liked being able to see other peoples designs and websites and projects it really helped me gain inspiration for my own projects so more of that.
4. I think it would be more useful to have someone explain more of the channels because I felt overwhelmed.
5. A complete noob channel.

Question: Let us know if you have any additional feedback for us here. Also, if you would like to further chat about your feedback and experiences with Design Buddies, please leave your name and email below. (optional)

1. Design buddies is a great resource just hard to navigate for first time Discord users. Maybe provide a more in depth tutorial at discord before asking students to join just in case they are unfamiliar with the platform
2. I don't. I liked it !
3. I think the rating system on this google form could be clarified or otherwise made more intuitive. I am not sure if I am supposed to rate 5 or 1 for some of the questions that ask how useful some features are.
4. I feel like there are too many channels, being someone that is new to this industry and discord.

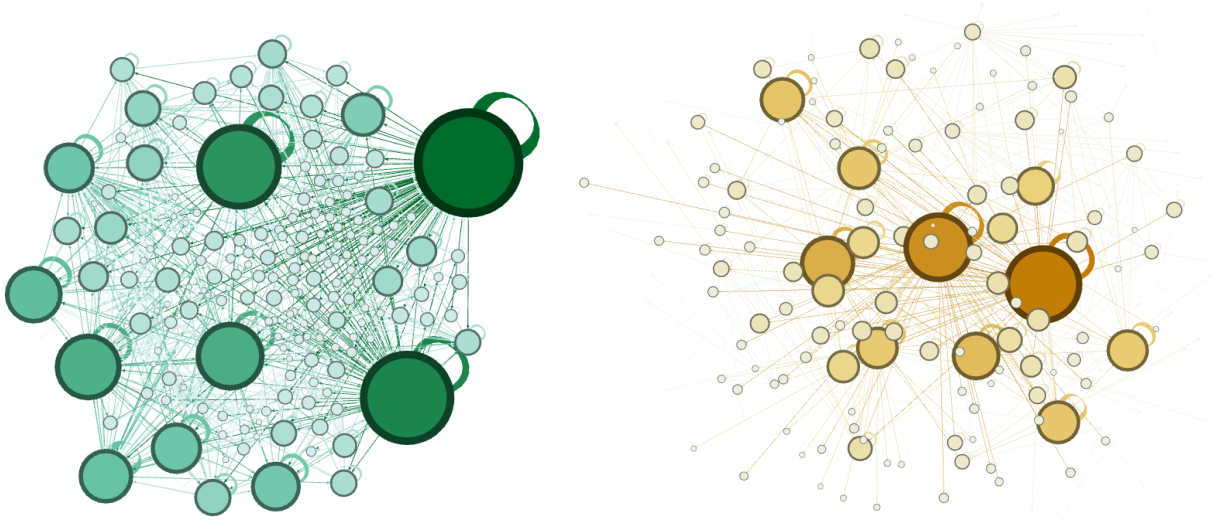
5. All of the channels can be intimidating at first.
6. The server is overwhelming because of how large it is, so I think that being able to toggle the viewable channels with self-react roles would make it less intimidating.

6.4 Social network analysis - full graphs (no filtering)

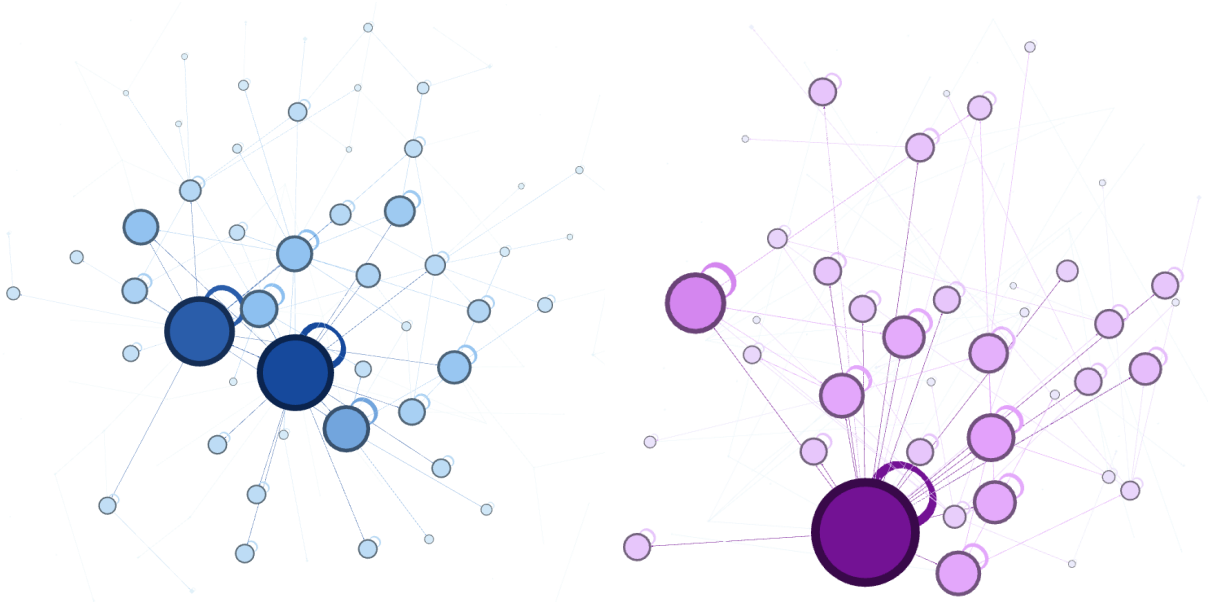
Figure 5

Full social network analysis

#ask-mentors (left) and #career-questions (right)



#design-feedback (left) and #portfolio-feedback (right)



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