

# **P2P Learning | Ideate: Conceptual Models & Sketches**

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## Conceptual Model

Our central metaphor revolves around the bartering system. We discuss that in detail in this report after the following table and conceptual model. The following table shows our objects, attributes, and operations that support it:

Objects	Attributes	Operations
School	<ul style="list-style-type: none"> <li>• School name</li> </ul>	<ul style="list-style-type: none"> <li>• Join</li> <li>• Leave</li> </ul>
Peer	<ul style="list-style-type: none"> <li>• Name</li> <li>• Metadata (<i>program, bio, interested fields, karma</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• View</li> <li>• Message</li> </ul>
Feed	<ul style="list-style-type: none"> <li>• Posts</li> <li>• Groups</li> </ul>	<ul style="list-style-type: none"> <li>• View list of posts/groups</li> <li>• View specific post/group</li> <li>• Search for post/group</li> <li>• Filter (deeper filters)</li> <li>• Sort</li> <li>• Create new post/group</li> </ul>
Group	<ul style="list-style-type: none"> <li>• Group name</li> <li>• Metadata (<i>Expectation, Type, Size, Description, Members, Tags</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• View</li> <li>• Request join</li> <li>• Message</li> <li>• Leave</li> <li>• Close</li> </ul>
Post	<ul style="list-style-type: none"> <li>• Title (<i>looking for x topic</i>)</li> <li>• Peer (<i>creator</i>)</li> <li>• Description (<i>expectations, subject, topic</i>)</li> <li>• Tags (<i>expectation type, field, location → for filters</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• View</li> <li>• Message</li> <li>• Close</li> </ul>
Inbox	<ul style="list-style-type: none"> <li>• Chats</li> </ul>	<ul style="list-style-type: none"> <li>• View list of chats</li> <li>• View specific chat</li> <li>• Search chat</li> <li>• Pin</li> </ul>
Chat	<ul style="list-style-type: none"> <li>• Chat name</li> <li>• Members</li> <li>• Conversation</li> <li>• Message</li> </ul>	<ul style="list-style-type: none"> <li>• View conversation</li> <li>• Send message</li> <li>• Search conversation</li> <li>• Delete message/conversation</li> <li>• Save message/conversation</li> </ul>

*Table 1. Objects-Attributes-Operation table for the conceptual model*

The following figure shows the conceptual model for our project. It illustrates the relationship between the objects listed in Table 1 along with their associated attributes.

## P2P Learning Conceptual Model

A peer-to-peer learning facilitating mobile application

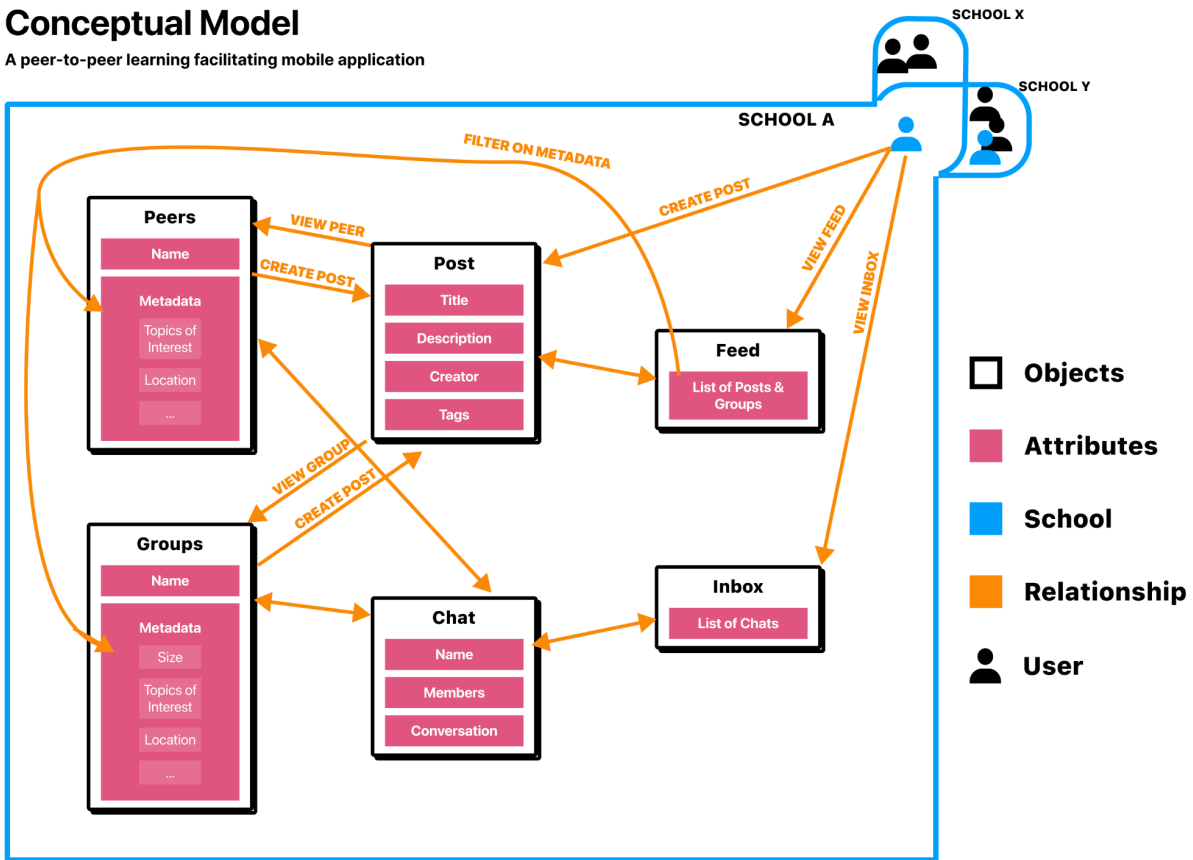


Figure 1. Conceptual model for our P2P Learning

## Justification

The final conceptual model was derived from the ideas and approaches implemented in the work of our team members individually for their initial individual version conceptual model (see Appendix B).

**Central Metaphor:** The idea for this model stems from a two-sided market where an intermediate service is working with two different markets to interconnect them (Rysman, 2009) like what is done in Uber (*Earn Money by Driving or Get a Ride Now* | Uber Canada, n.d.) and Airbnb (*Airbnb*, n.d.). However, we moved away from the term “market” to distance ourselves and our users from the concept of money by opting for a more neutral trading term like “barter.” From our users' perspective, they will be bartering by

interacting through our platform to offer themselves and trade their expertise with someone who can also provide it as seen similarly with Alencia (Appendix C.1). In addition to bartering as in individual peer, users can also barter as a formed group by offering collaborative learning opportunities for individuals like Edward. This could also support Edward (Appendix C.1) by allowing him to offer himself as someone to further a group's understanding as a learner to some teachers.

**Interface type:** We settled with a **mobile application** since we believe the phone is the most accessible device for these types of on-the-go social connection tasks. Furthermore, there has been a growing popularity of the mobile-first design methodology, where mobile applications are envisioned and developed first to ensure more optimized and robust responsive designs.

**Interaction type:** Exploratory and operational. Through our application, users are exploring possibilities to satisfy their learning needs and operating on various functions to meet those needs.

The following provides more insight into the objects and their associated terminologies:

**School:** To accommodate students across many different institutions, we added School to our conceptual model to demonstrate that the model exists within each School. A peer can potentially be in multiple schools to access their network; this could be useful if a specific course is consistent across schools.

**Peer:** Each user is represented as a peer learner. They are represented as a profile with metadata associated with them; this includes basic information (name, course, study habits, etc) and also the subjects that they are interested in. This information is used to present relevant peers to each other.

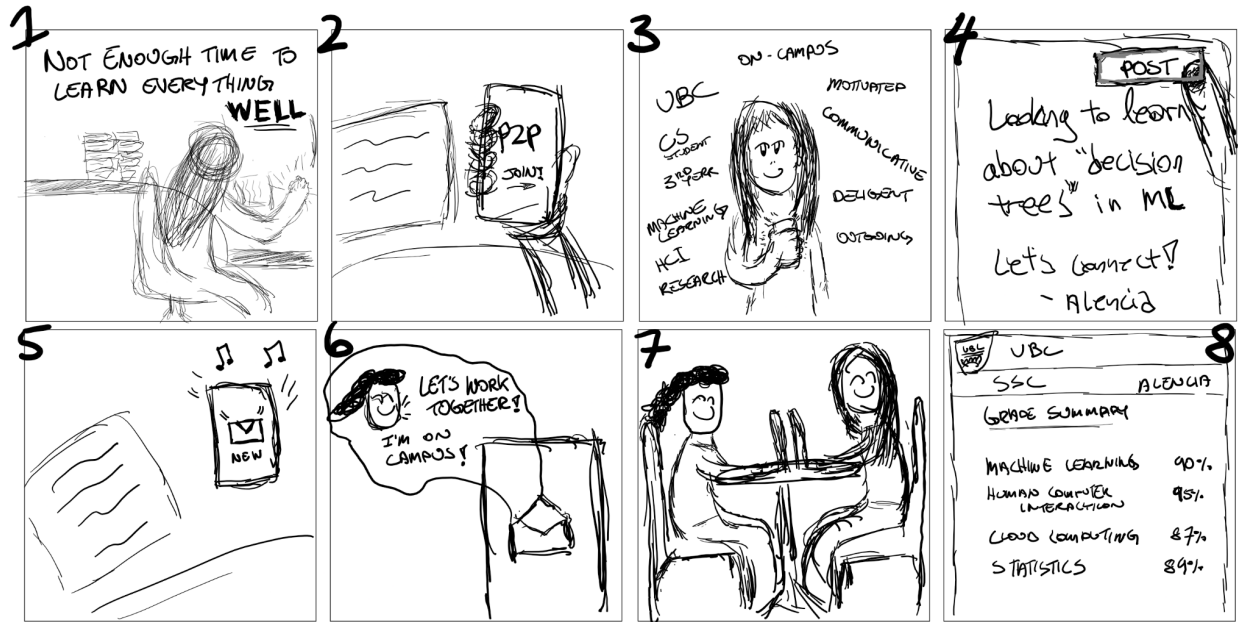
**Post:** Peers can post their needs or read posts by other individual peers or groups in the system. This includes details on title, course, subject area and expectations. These posts are the entryways for peers or groups to connect with each other. We chose the term “post” because of its common usage and familiarity.

**Group:** Peers can make a new group or post updates on the group, like needing more peers to join that particular group. To create a reliable group, people can view and post their expectations, their background, their topics of interest, and their strength or weaknesses to optimize their potential matches.

**Feed:** Each peer has access to a feed that displays the lists of posts and groups relevant to their profile which can be further filtered based on location, subject, etc. The feed can also be searched and sorted.

**Chats:** Chats are how peers and groups interact with each other. These are used to assess for suitable matches, discuss queries, and maintain connections. Peers have options to view conversations, search through conversations, send messages, delete messages or conversations, and save messages or conversations. Similar to posts in a feed, these chats are made available in a collection—that is the **Inbox**.

## Storyboard



1. Alencia is frustrated that she cannot learn everything in time for her examinations
2. She picks up her mobile phone and opens up the P2PLearning application
3. She makes an account and fills out her profile with relevant information as it pertains to her work
4. She makes a post to seek a peer or group to study with her and fill in her knowledge gaps
5. She receives a notification on her phone with a new chat in her inbox
6. She opens the chat and learns that someone who lives nearby is able to connect with her to study
7. She likes their message and meets up with them to study collaboratively and get a lot more done than she could have if she had studied independently
8. Alencia is able to excel in her all of her courses this term with her busy schedule while making minimal sacrifices

## References

*Airbnb: Vacation Rentals, Cabins, Beach Houses, Unique Homes & Experiences.* (n.d.). Airbnb. Retrieved October 25, 2022, from <https://www.airbnb.ca/>

*Earn Money by Driving or Get a Ride Now | Uber Canada.* (n.d.). Retrieved October 25, 2022, from <https://www.uber.com/ca/en/>

Rysman, M. (2009). The economics of two-sided markets. *Journal of economic perspectives*, 23(3), 125-43.

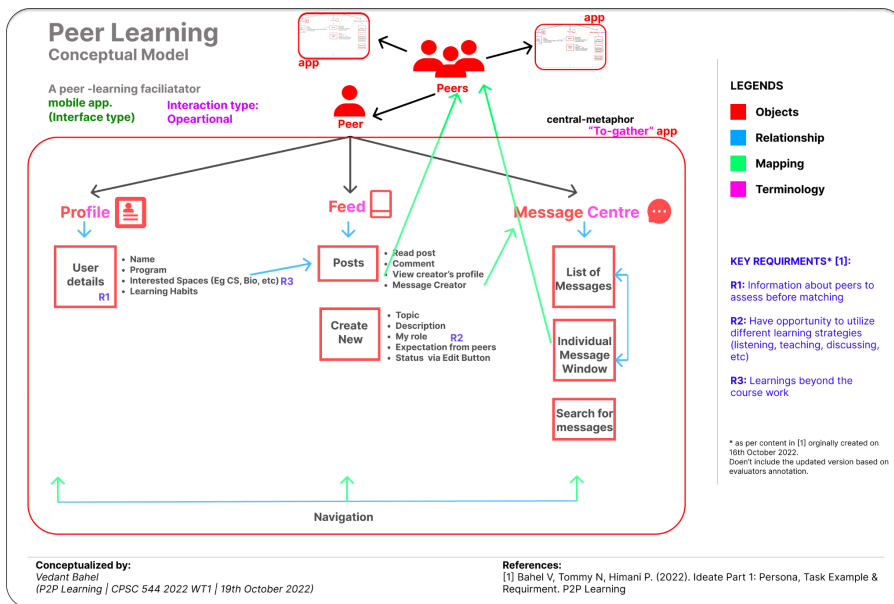
## Appendices

### A) Team Contribution

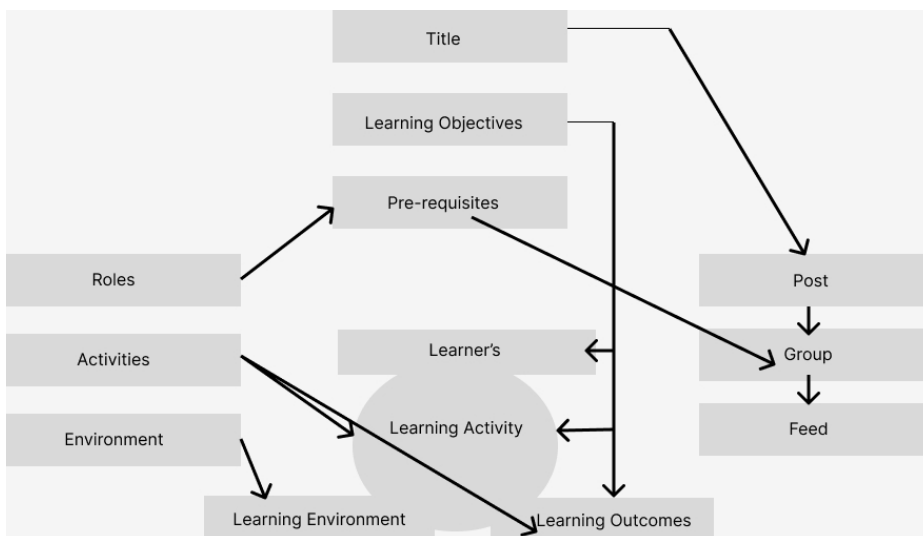
- **Vedant B:** Conceptual model and report
- **Himani P:** Updated requirements, Conceptual model improvements & discussion, and report
- **Tommy N:** Conceptual model refining & discussion, Storyboard sketching, and report edits

### B) Individual Conceptual Models

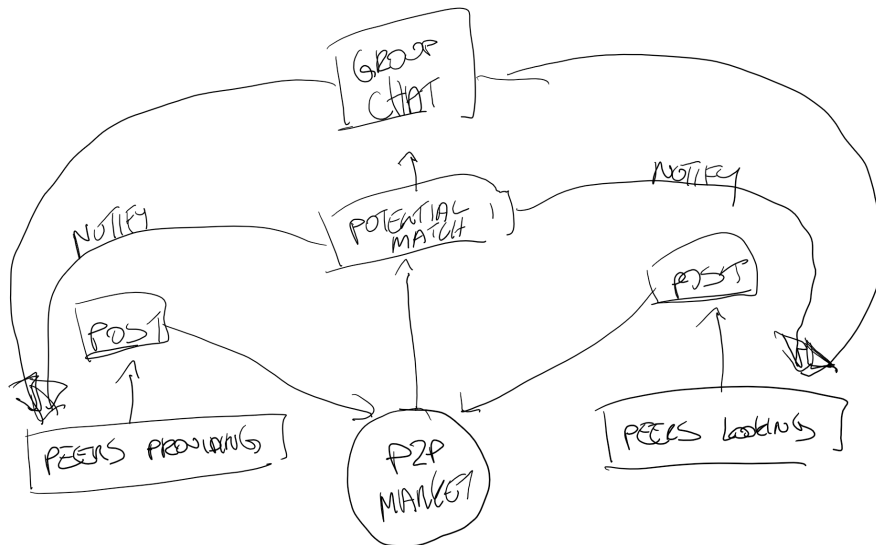
#### B.1) Vedant B's Conceptual Model



#### B.2) Himani P's Conceptual Model



### B.3) Tommy's Conceptual Model



### C.1) Updated Task Examples

#### Alencia uses peer-learning app to search feature to look for people in her university or local area

Alencia is a 3rd-year undergraduate student in Computer Science. She is a fairly competent student who optimizes her schedule really well, however, she is looking for a suitable peer to connect with to better make use of her time. In the past, she has tried to reach out to her classmates in-person and through social platforms provided by her classes, like Piazza and Canvas, but they never really gain much traction. She is not satisfied learning with friends as she thinks of it as a distraction—ultimately leading to unproductive work. Alencia is struggling with the "decision tree" concept from her machine learning (ML) course. To optimize her time, Alencia believes that she can accomplish much more if she can fill in the gaps in her knowledge by learning collaboratively in a group. Also, she likes to strengthen her knowledge by teaching as well as learning from others. She grabs her phone and opens a peer-learner app. She searches for people in her university or nearby area who are studying similar concepts and are interested in collaborating. She puts the keywords "machine learning and decision tree" and hits the search button. She finds a search result of a post by Chloe. The post was titled "group study session on machine learning" with a listed ideal group size of 3. The post status showed only one vacancy. Alencia checked Chloe's profile and found her to be a good person to collaborate with. Alencia immediately messaged Chloe. After chatting Alencia decides to study together with Chloe and the group.

#### Alencia posts about seeking peers to study together in the peer-learning app

Alencia had a wonderful time studying ML last time with the group she found. A week later, she is now looking for another set of people for another course she is taking on cloud computing. She searches for cloud computing but is unable to find any posts. She creates her own post and titles it "seeking peers to study cloud computing". She details



the specific sections that she is struggling with and needs assistance with. She also states the topics that she is good at and can offer to tutor while further adding details about the general expectation and group size. She posts and waits for some sort of engagement. An hour later, she receives a message from Brandon, who knows the topic that Alencia is struggling with, offering to tutor her. They plan a meetup together. Later on, 2 more peers reach out to collaborate. Alencia adds all of them to the same group and they all meet up to study collaboratively together.

**Edward finds a collaborative learning team to help him catch up and be motivated.**

Edward has taken PSYC101, an introduction to psychology, this term. He has been struggling with the concepts and terminologies and has now fallen a couple of weeks behind in class. Given that, he is too ashamed to attend office hours. Edward is determined to get back on his feet and knows he would benefit from some sort of collaborative group learning because he gets too distracted working alone. He looks for a platform that allows him to connect with other groups who are open to teaching him. Edward finds a nice group that has the capacity to help others who are behind like himself; since this group has listed that they are open to teaching to improve their own understanding, Edward does not feel like he is too much of a burden. While they are not teaching him, the group can continue to learn collaboratively—allowing Edward to learn how other students process the concepts and the best approaches to excelling in PSYC101. When Edward leaves, he is now motivated and looks forward to studying with these new skills. He feels more accountable for his work now and wants to learn more so that he can meet up with his collaborative group and contribute.

**C.2) Updated Requirements**

<p>Requirement #1</p> <p>Information about peers to assess before matching</p>	<p>Type: Functional and User characteristic</p> <p>Priority Level: Must have</p>
<p>Description: Top requirements noted from the responses were:</p> <ul style="list-style-type: none"> <li>● The interface should provide sufficient matching based upon the school, location, and time</li> <li>● The interface should provide peer habits and topic area</li> <li>● The interface should provide the ability to see user profile so they can network and know about their subject ideas</li> </ul>	
<p>Rationale: One of the key requirements that we could identify is the need of users to have information about their potential matches. However, the matching criteria for most of the responses were very different and would be difficult to manage each matching need in our project. We have identified the most reported matching such as habits, time, and location. Another point was users would like to see everyone's profile in order to match their profile with others. Some information like their expectations, collaborative learning characteristics (learner/teacher), and knowledge of the topic would be of great help. This kind of information may serve our users well to help save their time and connect better with others—especially with managing expectations.</p>	

<p>Requirement #2</p> <p>Opportunity to utilize different learning strategies</p>	<p>Type: Social environment</p> <p>Priority Level: Must have</p>
<p>Description: Top requirements noted from the responses were:</p> <ul style="list-style-type: none"> <li>● The interface should provide a good sense of understanding with peers</li> <li>● The interface should provide positive connections</li> <li>● The interface should emphasise upon everyone's pace</li> </ul>	
<p>Rationale: Learning is very subjective as it depends upon how a person perceives the information, motivation level, communication, knowledge, learning abilities, problem-solving skills, etc. Some people like Edward need help with basic concepts, as his learning rate is different from others. Some might know all the concepts and just want to teach to solidify their understanding or some want to do both like Alencia. Moreover, some might be more interested in having takeaways from a general discussion. Based on this, we identify one requirement i.e. how collaborative learning (CL) can be facilitated while meeting these user requirements. Thus, we have found the need to highlight the building of social networks where people can post, look for peers, and can look at their needs and be capable of understanding someone's pace of learning. This will allow us to form an efficient group and working in teams may be what someone like Edward may need to strive for his target goals. The aim here is to provide a safe environment free from judgement by allowing people to be open to these kinds of environments and potentially set their expectations in advance.</p>	

<p>Requirement #3</p> <p>Learnings beyond the course work</p>	<p>Type: Functional and Usability goals and Pragmatic</p> <p>Priority Level: Could have</p>
<p>Description: Top requirements noted from the responses were:</p> <ul style="list-style-type: none"> <li>● The interface should provide growth beyond course work</li> <li>● The interface should provide platform which enables them to grow outside their universities</li> </ul>	
<p>Rationale: This was mildly addressed in the survey response, but our team finds this very useful and pragmatic as it is something unique this platform can leverage to be more than just a course-focus platform. We believe that if we can facilitate an environment where users are able to learn beyond what they are doing for their classes, then the learnings that they achieve for their classes are further refined and solidified. Furthermore, users can go on to network and connect with like-minded individuals to potentially work on projects, hackathons, or various other activities. Learning skills such as how to answer in an interview, or what is the future in a particular field may help the learners to look for future opportunities too. This addition to the interface may provide our users with lifelong learning and greater fulfillment—where users can continue to grow and even return to assist others along similar paths.</p>	