11.965, Reflective Practice, Or, How to Give Global Relevance to Local Knowledge
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Lecture 5: Virtual Worlds and Their Role in Creative Work

Discussion of yesterday's exercise

When we create an idea, we feel like it is our idea. In some sense, this idea is our self. To be more capable of learning about what we have produced, we need to separate the idea from our self. The idea is like a living object; I will not fight for her. In this case the best approach is not to defend one's idea, but put it aside and look at it objectively.

In yesterday's exercise, you did not have adequate information for improving the theory in use.

The capacity for reframing is very interesting. It is interesting to see one's idea being dismantled, and not be afraid of it. The mind has a characteristic described as a self-organizing system. It will always create a logic. If I destroy a theory I have in my mind, my mind will feel very disturbed at first, but then will create a new theory. As a facilitator, we always need to disturb people's thinking to some extent.

When you say the facilitator's role is to disturb people, and that everyone has some level of disturbance they can support without stress, how can you tell what level of stress people can support? It seems to me the role is to keep the level of stress as high as possible without having everyone break down.

Some methods encourage excessive stress in order to break down, so it just depends on what stress is appropriate.

Can you talk about the exercise of yesterday?

There were two distinct phases in the exercise. We needed an object of analysis, and that was some sort of espoused theory. We gave you a problem so you could identify some solution or strategy that would be the object of analysis. The second phase was to put the problem aside, and look at our reasoning, so then we had to operate on a different level of analysis. We were trying to become aware of our assumptions in our reasoning and logic, and train ourselves to think of questions that help people identify their assumptions.

The first step to identifying the theory in use is to identify the logic behind the espoused theory. What we didn't get to do was to look at the sequence of assumptions; through that exercise, you can get to the theory in use. We didn't make that explicit – we just threw you into the exercise without knowing what the process was like.

What were your impressions of yesterday's exercise?

[The instructors draw a graphical representation on the board, with three phases: creation of an object, analyzing the object, and discovering the theory in use.]

It was helpful to see the underlying biases we all have. We all go in with a particular frame – we all got the same one sheet of data and came up with all this [gestures towards sheets with each group's questions and assumptions].

This was difficult for people – at times we just kept going back to the problem (the social issue), rather than staying on the cognitive level (the underlying logic).

Presentation – Mental Models and Virtual Worlds

Now we will consider models that we construct in our mind for a specific task.

If I don't know where the resources are, I stay immobilized. Throughout the year, we try to improve our mental model of MIT. We can see the amount of initiative we are able to take, based on our mental model.

Can you explain why we want to know what our mental models are?

When we are working with different people, we need to be able to understand their mental models. They are talking with us, but are giving meaning to my words through their mental models. I can say the same phrase to different people, and they will interpret them differently.

We are not aware of our mental models. Mental models are tacit. We use them, but we don't understand their main features. People may react in a way I was not expecting, people may interpret our expressions in different ways, or may make a mistake consistently because the mistake is a consequence of the mental model being used. When we make the same mistake systematically, we need to find which mental model we have in our minds. When we help people change their lives and how they are tackling their problems, we have to change their mental models.

Also, we can learn from other people's mental models. They may be better than ours. Mental models are a very important component of our resources for professional work.

Do people only have one mental model, or several? If they have several, are they coherent?

Not necessarily. The mental models we are considering are operational, used for a particular task. They may have contradictions among them; no one is able to be completely consistent. I think there is a basic coherence among them, but not complete.

How do you identify mental models?

This is the exercise we will do today. It is like riding a bike, easiest to learn by doing.

Example of Exercise

Each one of you should try to write some elements of your MIT mental model, in preparation for playing the role of facilitator when Ezra describes his mental model.

For the CARE people, it might be easier to work with an object you know better. So you can use the Atlanta headquarters building if you want.

What is a mental model? Where the opportunities and resources are?

I think Ezra's idea is very good – with no parameters, what images come to mind?

First, just retrieve what we have in memory about MIT, not trying to interpret. When I say "MIT" what comes out in my mind? The second step is to try to describe how I use it. What kind of actions do I do here? And why do I do these actions in this place? The "why" of this place is important in figuring out the function of this place for me.

It's about the interpretation of a physical object. In this case, it's an institution that has a building. We are talking about the institution, not just the building – everything that happens here. These are the components we are trying to map. We have a clear physical reference in this case.

Can you make a graphical representation?

Yes, the best is to combine a graphical representation and words.

[Students are given 5-10 minutes for this exercise.]

Now Ezra will describe his model of MIT and reconstruct his model with us.

Ezra: It starts with tasks, figuring out what I need to do, then what resources or communities I need to accomplish those tasks. There are a number of elements of this decision-making process. Functional elements: the people, depending on what my needs are – people I'm interested in socializing with, or collaborating with. Another is the type of space, and how that physical space can meet my needs – eating lunch, the Athena cluster, a place I can use my laptop. And then there are specific resources I can find in that space, like the ability to check out books, or get a cup of coffee. A library might have multiple resources clustered together, so it becomes an opportune location.

Wait, I thought this was what we were going to ask him questions about.

I want to understand if this is an accurate way of depicting my mental map. Furthermore, is this similar to the way other people perceive MIT, or is it only me? I am trying to see if this is a common mental model.

Another important part of this is the physical context – am I starting in Killian Court, or the Student Center, or Kendall Square?

Wait, if what you're really interested in is location, that is different from context.

Finally, time of day is important.

[On the board:

1) tasks
2) needs

3) decision

Functional elements:

1) people
2) type of space
3) resources
4) facilities for tasks
5) location
6) amount of time
7) time of day
8) access
9) weather

He also draws a schematic including DUSP headquarters, the library, Steam Café, Student Center, etc.]

Access – this is both physical access and social access, whether I feel comfortable there.

Do you change your routes depending on the weather?

Yes, actually. And as Sebastiao pointed out, this is a dynamic mental map. My mental map is always shifting throughout the day, so each decision will be slightly different.

It seems to me like you have two different layers. A stock of information (physical map), but also things like amount of time and weather, that to me are how you evaluate the information. To me it's almost like a database and queries, and you query the database in different ways.

When you say data and queries, maybe it's about the variability of the component. The library is not very variable, but the weather is.

Sebastiao: Can you explain how you do a task, in this model?

Ezra: Let's say I have to make a drawing using Illustrator or Photoshop. How long is it going to take me to do this task? Do I have two hours? Say I have three hours, great, I've got the time. Is it lunchtime, am I hungry? Then the next question is what are the resources I need to accomplish this task? Do I have my laptop with me? [Adds "laptop" to the functional elements list.]

Resources – there is a baseline, and preferences. But the big one is probably the people. If I go to 10-445 there are other designers who can help me, so that's significant. And one that we have forgotten here is the design of the physical space – the ergonomics, daylighting, temperature.

As an architect, I know you can draw a map of a design idea – hierarchical, for instance. What I was trying to see in the map – it looks like a rough physical map, but doesn't have relations, how important these are two you. And some elements are fairly basic, but some are relational. I feel like I'm seeing superimposed things that don't allow me to clearly get at hierarchies, or relationships.

Ezra: I think these are the underlying characteristics. My point is that these are what underlie the hierarchies. This is dynamic – based on all these different things, the hierarchies are constantly shifting and in flow.

I think what she's saying is, what is the character of the dynamic? How do all those things relate to each other?

I think that's the next stage of my own research – I don't know the answer to that question, which of those things is most important. Maybe these are in a hierarchical list [indicates the functional elements list].

It's a little unclear to me what this is actually for. You have this wealth of information and there are a lot of relationships, but what does this help you do?

My interest is if there's some way to take this kind of knowledge and use it for the design of physical spaces. The work of Kevin Lynch – he figured out various components of how people make their way through cities. This is like a cognitive map of a number things that are not necessarily physical, but are related to the physical.

I think that's not the question Chris was asking. How does this model help you decide how to act, in your day, get around, find the best space to work? How does this mental model help you organize your behavior?

I think I use this more the other way around, constantly checking my model, rather than my behavior.

A comment based on my lack of knowledge of MIT, thinking of you as a guide – as we acquire more information and knowledge, we're constantly adding lines to our map. How you got to where you are, and how you might be able to help a new student with your map, to make it more direct for them compared to how it was for you?

I think it gives me a more complex and dynamic ability to make decisions. I'm probably more likely to make a good decision, so overall the decision-making process is more streamlined, and I'm more organized and efficient.

Participant Exercise

Sebastiao: The mental models we use do not need to be sophisticated, but we should understand how we are using them. After the break, we will do an exercise in two groups. One person in each group will be a volunteer in constructing a model, and the others will help them go forward. I would suggest something that is spatial, not very abstract. Being able to think about something in space makes it easier to think about the functions.

The method should be going from the task to the components, since the task helps to identify the function, and the function helps to identify the components. The mental model should be highly effective and robust – can be used for many different things – and simple, not too complex.

[After a break, the students work in groups for 30 minutes.]

Feedback about the exercise?

I began to doubt whether I understood the model. I think of models in terms of things like the sustainability model, so I was getting a bit lost.

It was interesting how people's interpretations of the map were different depending on their background and experiences.

I felt it was a more difficult model for me to understand, compared to the other exercise we have done.

It was interesting trying to extract commonalities and differences. It's an interesting synthetic process, comparing the different models people have of the same place. It's interesting to see where people's maps overlap and diverge.

Before going on, I will discuss the concept. The task we had to do was to design a model of MIT, like a map. The mental model needs to be simple enough to be used naturally, without training or preparation, at the spot of the action. At the same time, it should be very robust, so I can use it in any situations I have. In our mind, we do not have complete maps, but elements we combine when we need to make a decision.

The map is not your mental model. The map is a brief description of your mental model.

Claudia: We briefly went around and everyone explained their mental model, then we chose one to begin to develop more fully. Yuma began to talk about her work and her reason for being at MIT. She wants to expand resources and knowledge to improve her work in Brazil. We began to identify some of the components of what she uses in her head to maneuver at MIT.

Please describe not the mental model itself, but the process of discovering it.

Claudia: First, we needed to determine what model we were trying to construct. Then we started asking what she does to find those connections, and why. If she's looking for information or feedback, she finds classes that are dealing with that subject, and through those classes, finds people interested in the same thing. So these activities were the starting point for finding the components of the mental model.

In this process today, did you have difficulty identifying the components and this virtual world that you have? What was difficult for you in this exercise?

Yes, it was difficult, because I didn't have this model before.

You have the model, you use it, but you're just making it explicit.

If what you're working on is a network of people, you would need to use a different type of map, so you could actually draw your network. With a campus map, you couldn't actually visualize what she wanted to see.

But I think we're talking about the physical.

Yuma's model is interesting because now that she has identified how to make the first link with total strangers at DUSP, through classes and projects, now she can do the same at Sloan, now that she has made this process explicit.

So the model is how you get what you want out of MIT?

Yes, identifying what I needed to get this to work.

It would be useful to discover what events trigger in us the ability to improve our mental model. We don't have time to do this, but it is a good question. For example, if you are only here for one year, how quickly you can construct a mental model of MIT is very important.