THE
PRODUCT
DESIGN
PROCESS

A GRAPHIC NOVEL

By ALISON WONG
ON A UNIVERSITY CAMPUS, IT'S THE BEGINNING OF THE SEMESTER...

SO TELL ME ABOUT YOUR FIRST DATE WITH MIKE!

OH, WHAT A STORY HANNA!

WAIT, WHERE'S OUR NEXT CLASS?

WE'RE LATE!

WELCOME TO "THE PRODUCT DESIGN PROCESS!!"

WHERE YOU'LL HAVE A GROUP TOO BIG, A BUDGET TOO SMALL, A TIME TOO SHORT AND A PROJECT TOO HARD.

JENNY! CAN WE STILL DROP?

HANNA, WE NEED THIS TO GRADUATE!
You'll be in teams of 6 that will be randomly selected. We will guide you through the design process and the faculty and staff will be here for reviews and guidance.

Your team will be responsible for developing an Alpha prototype of a product of your choice. It must work and look like a production product. You have a limited budget and must work together as a group.

The Next Day

Is this the yellow team?

YEP! Hi, I'm Hector.

Jenny! HANNA!

Oh great! The two girls are friends.

Oooh! Name tags!

I'd like to be team leader because when I was captain of the soccer team, ...

I'm qualified because I won an award for ...

I'd really like to run, but those two seem qualified. Nah... maybe something else.

Hey, looks like we have an agenda- we have to elect some officers.

I've counted the votes, and it looks like Brian is our new team leader and Hanna is our information coordinator.
OH GREAT... LIKE I REALLY KNOW WHAT I'M DOING.

UG! HECTOR'S IN OUR GROUP! I'VE HEARD HE DOESN'T DO ANYTHING!

ALRIGHT, LET'S START BY GETTING SOME BACKGROUND WHY DOESN'T EVERYONE INTRODUCE THEMSELVES? HANNA, PLEASE START...

WE'RE WASTING TIME! INSTEAD, WE SHOULD BE LISTING OUR SCHEDULES AND SKILLS. ALSO, THINGS LIKE "WHO HAS A CAR? WHO HAS A LAPTOP?"

WELL, I...

OOH WHO HAS AN ATTITUDE?

OKAY, WELL THANKS LANCE—ANYWAY, NEXT WEEK'S ASSIGNMENT IS TO BRAINSTORM AND COME UP WITH 10 NEW PRODUCT IDEAS USING 8 X 11" SHEETS

WE HAVE TO MAKE 10 THINGS ONLY OUT OF PAPER??

ON THE SHEETS, INCLUDE A LARGE TITLE, A BRIEF DESCRIPTION OF THE PRODUCT, AND MAYBE A SKETCH.

WHERE DO WE FIND IDEAS?

YOUR DAILY LIFE! LOOK AROUND YOU!
HAVE YOU DONE YOUR BRAINSTORMING YET JENNY?

OH, THAT CLASS? NO, NOT YET.

OUR TABLE!

HEY GIRLS!

AND TO TOP IT OFF- MY CLASS HAS A PAPER ALREADY DUE NEXT WEEK!

HEY GUYS, LOOK AT THIS CHAIR! WHAT IF WE DESIGNED IT TO HELP LIFT PEOPLE OUT? FOR THE ELDERLY? LIKE, IN A CAR!

HANNA, YOU ARE SUCH A NERD! I ONLY THINK ABOUT THAT CLASS WHEN I HAVE TO!

DOWN THE STREET...

I THOUGHT OF THIS COOL IDEA- BUT I CAN'T FIND ANY INFO ON IT.

WHAT? THERE'S STUFF BESIDES THE INTERNET?

HAVE YOU LOOKED AT JOURNALS OR PAPERS TOO?

ELSEWHERE...

OKAY, WHAT DO I NEED IN MY ROOM THAT I CAN'T FIND IN STORES?
Week 2

Ah, I have 2 minutes!

Meeting today 3:00
Bring Bx11 brainstorm sheets.

All the ideas are up. Let's have each person talk about theirs for a minute.

My idea...

Like this...

This idea helps...

Looks like we narrow it down to 2.

But I have at least 3 good ones!

Let's do a 'Pugh chart. It looks like this! We can list pros and cons and...

Um, Hanna, let's just pick the ones we like.

Yeah... Yah... um him...

Looks like we have our two...

Remote control rock climbing belayer

Lifting car seat for the elderly

I think we should split up into 2 subgroups to build mockups for the upcoming faculty review.

Okay, let's split into 2 subgroups and we'll meet again next week.
THE NEXT DAY

HEY, IT'S LANCE, I DIDN'T KNOW HE PLAYED ON THE TEAM.

COME JOIN US!

WHAT'S UP?

TO: ROCKCLIMB SUBGROUP
SUB: SUBGROUP MOCKUP MEETING

LET'S MEET IN LAB TOMORROW AT 3:00PM.

BRIAN

THE NEXT DAY

WHERE IS EVERYBODY?!

LAB 1

LAB 2

LATER

WHERE WERE YOU?!

WELL, WE RESEARCHED POSSIBLE CLIENTS AND MARKETS. WE HAVE LOTS OF DATA AND STATISTICS. YOU SHOULD DO THE ROAM MODEL TO SHOW THE BASIC IDEA ON HOW IT WILL WORK!
HANNA! I JUST TALKED TO JOHN FROM BLUE TEAM. HE SAID THE FACULTY REVIEW IS TOMORROW?! WHAT? HAVE YOU TALKED TO BRIAN ABOUT THIS? ...NO, MAYBE YOU CAN CALL HIM?

BRIAN

Everyone should be in class tomorrow! Faculty reviews! Come prepared!

IN CLASS THE NEXT DAY

Well, it would work kinda like this...

I guess it turns like so.

SO THAT'S ABOUT IT. ANY COMMENTS?

WHO IS YOUR CLIENT?

WHAT IS CURRENTLY ON THE MARKET?

IS THERE A NEED FOR THE PRODUCT?

DO YOU KNOW INDUSTRY SAFETY CODES?

WHAT IS AN EXPECTED PRICE RANGE?

HAVE YOU DONE BENCHMARKING?

DID YOU DO A PATENT SEARCH?

HAVE YOU TALKED TO POTENTIAL CUSTOMERS?

ARE YOU GOING TO SHOW THIS MOCKUP TO CUSTOMERS FOR FEEDBACK?

AFTER CLASS

HEY GUYS, LET'S GET TOGETHER AND TALK ABOUT THE FACULTY FEEDBACK.

CAN'T, HAVE A GAME NOW!

ECON TEST IN AN HOUR - BYE!

OH, MY FRIEND JUST ARRIVED AT THE AIRPORT!

SIGH... I HAVE OTHER STUFF TO DO TOO Y'KNOW.
WE'RE STILL ON FOR TOMORROW?

OF COURSE! OH WAIT...

I SCHEDULED A GROUP MEETING THEN.

I DON'T UNDERSTAND! WE HAD TICKETS ALREADY! WHEN ARE YOU GOING TO PUT ME FIRST?!

IT WAS THE ONLY TIME THE GROUP COULD MEET - IT'S SO HARD TO GET EVERYONE TOGETHER.

OR FOR TWO PEOPLE TO STAY TOGETHER.

I HATE THIS CLASS.

MEETING TODAY 5:00 PM CONF. ROOM FOOD PROVIDED

OKAY, WE’VE ALL READ THE FACULTY FEEDBACK. LET’S PICK ONE IDEA AND MOVE ON.

ROCK CLIMBING BELAYER

LIFTING CHAIR

4-2, IT'S THE REMOTE CONTROLLED BELAYER!
WHAT?! I DON'T WANT TO DO A ROCK CLIMBING MACHINE! I DON'T CARE ABOUT CLIMBING, I DON'T EVEN KNOW WHAT "BELAY" MEANS!

I AGREE, LET'S DO THE CHAIR!

HEY, WE'VE ALL GOT TO SACRIFICE FOR THE TEAM. THERE'S A MAJORITY VOTE AND NO ONE'S BUDGING. WE'VE GOT TO MOVE ON.

FINE. BUT DON'T EXPECT ME TO WORK HARD.

ALRIGHT, MOVING ON—THE FACULTY SUGGESTED WE MAKE A GANTT CHART.

IT'S A SCHEDULE FOR THE WHOLE SEMESTER?! I DON'T UNDERSTAND WHY WE HAVE TO DO THIS. IT SEEMS LIKE A BIG WASTE OF TIME! LET'S JUST DO A ROUGH ONE AND TURN IT IN.

LATER THAT DAY AT THE UNIVERSITY COMPUTER HELP DESK.

SCOTT, YOU'VE MISSED THE LAST 2 STAFF MEETINGS. BUT I TOLD YOU I HAD GROUP PROJECT MEETINGS.

I KNOW, BUT I THINK I'M GOING TO HAVE TO GIVE MARK SOME OF YOUR HOURS.

I NEED THOSE HOURS, I NEED THE MONEY.
WE NEED TO FIND OUT WHAT THE CLIENTS WANT. LET'S THINK OF QUESTIONS TO ASK.

I guess our budget is good for something.

ALRIGHT, WE'RE DONE! LET'S GO VISIT THE CLIENT.

LANCE, I DON'T HAVE MY CAR TODAY.

I'M TOO BUSY FOR THIS! I WISH MIKE WOULD HURRY UP AND...

MIKE! MEY CUTIE!

YOU MAY BE USEFUL AFTER ALL.

YEAH, I THINK WE'RE DONE. I'LL MEET YOU IN A SECOND.

SORRY GUYS, GOTA RUN! E-MAIL ME!

WHERE DO YOU THINK SHE WENT?

I HAVE NO IDEA...

well, let's go.
HERE WE ARE: ROCK CITY!

HI! WE CALLED EARLIER TO SET UP SOME INTERVIEWS.

YEP!

LANCE?

HEY, WHEN IN CLIENTVILLE, DO AS THE CLIENTS DO!

LET'S GIVE IT A TRY!

OKAY!

BELAY ON!

COME ON DOWN! I'VE GOT YOU.

* SIGNALS TO PARTNER TO PULL SLACK OUT OF ROPE WHEN CLIMBING HIGHER.

** WHEN CLIMBING DOWN, PARTNER MUST GIVE ROPE.

GOTCHA!
EVERYONE, DO INTERVIEWS AND GATHER RAW DATA!

Jack and I come here all the time! You need two people!

Greg and I just met—that's what you have to do if you come alone.

I like to go bouldering. There aren't ropes and you don't need a partner.

There are about 700 rock climbing gyms in the US today. What do you like about this one?

The ASCF estimates that there are one million rock climbers today. Why do you climb?

The cost of rock climbing equipment is about $200. If our product was at a reasonable cost, would you want one?

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WEEK 6

MEETING TODAY 4:00 P.M.
Go over customer data and discuss needs.

Let's translate the customer feedback into customer needs.

Has to be safe
Needs constant feedback
Can adjust to various weights

Hi guys, sorry I'm late!

Great. He comes in after all the important stuff's been decided. I think we should concentrate on our group needs...like attending meetings.

Hector, we'll catch you up.
I think we have a great list of needs, now let's generate metrics, ways to measure how we meet the needs.

Like numerical values of the needs, such as, how much weight does it need to pull?

Here we go.

Later in the week, Hmm. These torque values are different.

Great job everyone! We now have a set of needs and quantifiable metrics!

I'll double check that.

Must be translucent blue? Who wrote that need?!

Now we choose which specs we want and what values to aim for.
NOW WE HAVE TO GENERATE CONCEPTS FROM THESE NEEDS AND SPECIFICATIONS.

DRAWINGS, MODELS, WHATEVER SHOWS HOW THE PRODUCT SATISFIES CUSTOMER NEED.

UC, I HATE DRAWING.

THEN YOU CAN USE CAD.

I HATE CAD.

WEEK 7

HEY, ANYONE WANT TO JOIN JENNY AND ME FOR COFFEE AT 1:00? COOL CAT CAFE ON MAIN ST. SEE YA!

HANNA

SIGH...

YOU KNOW WHAT? I ACTUALLY HAD A GREAT TIME! I EVEN CLIMBED AN 8.7 PATH!

SO HANNA, JUSTIN TOOK ME ROCK CLIMBING OF ALTHINGS FOR OUR DATE!

HEY, THERE'S SCOTT AND LANCE!

SHOOT, HAV'TA RUN-GOTTA TURN IN A GRAD SCHOOL APPLICATION

<SNAP>

GRAD SCHOOL?

YEAH, MY 3 INTERVIEWS HAVEN'T LED TO ANYTHING YET, SO I'M THINKING OF PURSUING A MASTERS.

WHAT ABOUT YOU? FUTURE PLANS?

WHAT'S YOUR FUTURE PLANS?

WOW, MY FUTURE PLANS CONSIST OF WHAT NEXT WEEK'S ASSIGNMENT IS...

HOW DOES HE HAVE THE TIME?
MEETING TODAY
BRING CONCEPT DRAWINGS - DISCUSS AND CHOOSE

HOLE IN GROUND

REMOTE CONTROL

BOAT WINCH

LET'S NARROW IT DOWN LIKE BEFORE

NO, I THINK WE SHOULD GET CUSTOMER FEEDBACK ON THESE IDEAS FIRST.

YEAH, LET'S GO BACK TO ROCK CITY - IT'D BE GOOD TO GET THEIR INPUT.

PLUS, I WANT TO TRY ROCKER CLIMBING MYSELF!

UM, YEAH, SURE. LET'S DO IT!

SCOTT, YOU HAVE YOUR CAR? YEP!
Another meeting?! I need a break. I’m sure they won’t miss me – I think the game needs me.

Oh, it’s 2:00. I can’t leave. They won’t miss me.

I’ve spent so much time on this class this week already. Besides, they won’t miss me.

At the Conf. Room

Where is everybody?

Well, it’s nice to know I can always count on you two.

Oh yes, isn’t it so nice.

Next, we have to make “works-like” models of our concepts for testing. Each of us will lead a group for different modules: the motor, the brakes, and the remote controls. Let’s each pair up and contact them.

Hey Lance–

Hey Hector–

Hey Jenny–

– We’ll be working together in a module subgroup. Let’s meet up…
Each subgroup focuses on a specific part.

Motors 'R Us

This worm gear has a lot of torque.

But it's not back-driveable.

Bob's Auto

How does this compare to magnetic particle braking?

Radio Haus

So the microprocessor can receive and process an RF signal as well as motor feedback.

Week 9

Concept selection meeting today. Bring module info.

Let's fill them out.

So we've discussed our concepts in detail. Now what?

Now, we should do a matrix chart. It helps us choose which concepts are best by rating everything against a norm. Like a boat winch in our case.
AND THE TEAM DISCUSSES SOME MORE

THE WORM GEAR IS SAFER - WE DON'T WANT IT TO SLIP.

BUT THE BIGGEST NEED CALLS FOR IT TO BE BACKDRIVABLE

LOOKS LIKE WE'RE SET ON A REMOTE CONTROL DEVICE WITH A DC SERVOMOTOR, A MAGNETIC PARTICLE BRAKE, AND AN OVERSPEED CLUTCH.

SO HANNA, WE ACTUALLY HAVE TO MAKE THIS WORK?

I HOPE YOU DIDN'T HAVE PLANS FOR THIS WEEKEND.

THE NEXT FEW DAYS...

HOME WAREHOUSE

I ADMIT IT, I NOW OFFICIALLY HAVE NO SOCIAL LIFE.

SORRY MIKE, I'LL CALL YOU BACK - I'M KINDA BUSY NOW.

SHOOT, THERE'S A BIG TOURNAMENT THIS WEEKEND. WHICH TEAM COMES FIRST?

AM I THE ONLY ONE WHO KNOWS ELECTRONICS?

MACHINING'S FUN! WEEE!!!

I HATE THIS CLASS. I LOVE THIS CLASS. I -
WEEK 10

MOCKUP TESTING TODAY AT ROCK CITY
MEET UP AT 2:00 PM IN THE CONF. ROOM.
SUBGROUP LEADERS SHOULD GO SORRY, I CAN'T MAKE IT.
BRIAN

OK, LET IT RIP!

WOW, THAT'S QUITE A STRONG MOTOR. SHOULD WE GET ANOTHER?

ACTUALLY, IT'S JUST THE CONTROLLER. THAT NEEDS ADJUSTING—CHANGING THE CURRENT BY ALTERING THE RESISTANCE WILL SLOW IT DOWN.

UM, RIGHT! I'LL LET YOU TAKE CARE OF THAT.

ALL READY! LET'S TRY IT AGAIN?

BETTER! YES!!
ATTACHED: MOCKUP TESTING RESULTS.
I SUGGEST EACH TEAM WORK ON THEIR COMPONENTS FOR THE REST OF THE WEEK.

LATE FOR SUBGROUP MEETING!

HECTOR, WHERE ARE YOU? WE NEED YOU AT JASON'S GARAGE. HECTOR?

THIS BRAKE SHOULD AUTOMATICALLY SENSE WHEN THE ACCELERATION IS TOO HIGH.

IT WORKS!

SHOOT, NOW IT WON'T MOVE

THE CONTROLS ARE WORKING, LET'S SEE HOW IT PULLS!

IT WORKS!

IT WORKS!

ALRIGHT, I WIRED IT CORRECTLY

IT WORKS!

OOPS, EXCUSE ME!
Later that week...

...and then Hanna says, "No Brian, you can't eat the drillbits!" Hahaha!

On Jenny's Date with Mike

At Hector's Concert

Meeting today, discuss product architecture important!

Alright, let's see how our modules all fit together.

Hector, what is that?

It's my T-Square! Didn't you say something about architecture in your email?

Hector, "product architecture" is how all the parts of the product work together! Have you ever heard of "modularity?"

Anyway... we've designed the brake so it fits right here.

What?!

Brian, the brake doesn't go there! That's where the clutch goes!

Lance, that makes no sense. Obviously, the clutch is mounted to the spool end.
I was in charge of that part! You don't even know what we've been working on!

Why didn't they discuss this? That's just common sense if those two modules work together.

Haha! At least none of our components have any of those problems.

Wow, this has lasted two hours already. I'm going to miss my friend's party.

Hmm... I wonder if Jenny and my modules also have system architecture issues.

I didn't realize our separate parts were so integrated.

And I was under the impression yours had a different purpose.
THE NEXT DAY

HEY HANNA! WANT TO GRAB SOME LUNCH?

I HAVE GRADUATE SCHOOL APPLICATIONS, A HISTORY TEST TOMORROW, A FRIEND WHO I PROMISED TO TUTOR MATH TO, A DATE THIS WEEKEND, AND--

PLEASE HANNA! I KNOW YOU'D DO A GREAT JOB.

SURE!

AT LEAST HE WAS NICE ABOUT IT. NO SUCH THING AS A FREE LUNCH...

WOW, WHERE'D THE WEEK GO? WHAT, WHAT'S THIS?!

1 MORE WEEK UNTIL WORKING MODEL DUE
2 MORE WEEKS UNTIL FINAL PRESENTATION

MEETING
URGENT
PROGRESS REPORT AND LAST MINUTE TASKS!!

WE STILL HAVE TO DO A FINANCIAL REPORT, SOLID MODEL, PRESENTATION, ETC... AND HAVE AN ALPHA PROTOTYPE!

WHY DIDN'T WE SEE THIS COMING?!

GUESS WE DIDN'T MAKE A VERY CLEAR GANTT CHART.
EVERYONE, CALM DOWN. LET'S DO A SCHEDULE RIGHT NOW AND PRIORITIZE WHAT NEEDS TO GET DONE.

THE WORKING MODEL IS MOST IMPORTANT. THE FACULTY WILL NEED TO SEE IT WORK AT THE TECHNICAL REVIEW.

IN 7 DAYS!

COUNTDOWN TO REVIEW

BASSES

WRRRRRRRR

RING?

HOME WAREHOUSE RUN #42

I CAN'T BELIEVE THEY KNOW US BY FIRST NAME!

WE'RE READY TO GO!
The technical review is held at Rock City.

Welcome professors! Lance, the avid rock climber in our group, will demonstrate our product.

I'm ready!

Lance checks his equipment. The faculty and team watch. He climbs higher. The rope is auto-pulled so there is no slack. Lance lets go.

The force on the rope increases. The belayer brakes. Lance stays in the air. Sighs relief and presses the remote to be let down slowly.

It works!!
AT THE COOL CAT CAFE THE NEXT DAY

I WAS THINKING THAT YOU AND I SHOULD PRESENT BECAUSE WE KNOW THE PRODUCT BEST. ALSO, CAN WE TALK ABOUT WHAT TASKS EACH PERSON SHOULD DO THIS WEEK? I RESPECT YOUR OPINION.

WE CAN’T EVEN REST—THE PRESENTATION IS NEXT WEEK!

YEAH, IN SOME WAYS, THAT’S MORE IMPORTANT THAN THE WORKING MODEL.

EVERYONE LOOKS EXHAUSTED.

STAY AWAKE!

MEETING TODAY
PLANNING FOR THIS WEEK AND PRESENTATION
TASK DELEGATION

BUT I CAN’T

I WOULD ASK FOR VOLUNTEERS, BUT WE DON’T HAVE TIME. I’VE ASSIGNED TASKS TO EACH OF YOU BASED ON YOUR SPECIFIC TALENTS.
The presentation needs to be 15 minutes long and then "Q&A" follows. There will be 300+ people including engineers, CEOs, entrepreneurs, and professors. We've got to make this good! Time is short! We have 6 days! The presentations start at 7:00 PM and we're first!

Hey Lance, I did some quick calculations! We can make millions!

Hector, we aren't selling to the million users, our target segment are gym owners - that's where the IRR is!

Brian, you can't do everything! Come help me with the presentation.

Click to add title: Should we add a video clip there?

Ahhhh! The presentation is tomorrow!
9 am

Ah! The motor's not working!

What size? I'll run and get them.

It's okay. Calm down. We just need a few screws.

12 pm

Jenny, you'll be here handing out info about our product to the audience as they come in.

Okay, gang, a run-through!

3 pm

Lance, you'll set up here. Your demo will be right after the intro.

Oh, the pamphlets are printed! Well, someone else can fold them!

Oh, the pamphlets are printed! Oh, I should fold them, I know nobody else will.

6 pm

Let's set up! We're on first!
WELCOME EVERYONE. I'VE BRIAN AND THIS IS HANNA. WE ARE REPRESENTING THE YELLOW TEAM...
YES, THE PRODUCT CONFORMS TO ALL INDUSTRY SAFETY CODES, SUCH AS...

WELL ACTUALLY, THE MAGNETIC PARTICLE BRAKE WORKS BY...

OUR CALCULATED RETURN ON INVESTMENT IS...

I'M SORRY, BUT TIME IS UP. THANK YOU YELLOW TEAM!

great job!

YELLOW BLUE GREEN RED PUT

I'M REALLY GLAD I GOT TO WORK WITH ALL OF YOU.

WHAT ARE YOU DOING AFTER GRADUATION?

NEVER THOUGHT I'D LEARN SO MUCH... ABOUT PEOPLE!

SO I WAS TALKING WITH THIS PATENT ATTORNEY LAST WEEK.

I CAN'T BELIEVE WE WERE PUBLISHED IN THAT NATIONAL SCIENCE MAGAZINE!

HEY HANNA, YOU FREE FRIDAY NIGHT?