LEARNER ASSESSMENT FINAL PROJECT
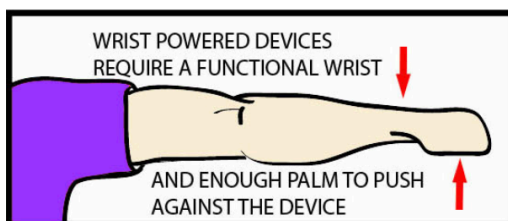e-NABLE community digital badges l Niberca (Gigi) Polo, 2018

Context
Online community of middle and high schoolers, and adults, working together on the open internet. This group is diverse in terms of background (race, ethnicity, education, fields of study, and expertise). Some are young kids still in school, some are professional engineers and makers, and some are parents of kids in need of prosthetics. This community comes together to share knowledge, tools, and other resources using DIY approaches, toolkits, and online conversations to produce, refine, and test these prosthetics; they also advocated for policy change and find resources to support their productions and help people in need of prosthetics. Three times a year the community meets in a location for a 2-3 days conference to share their work progress.
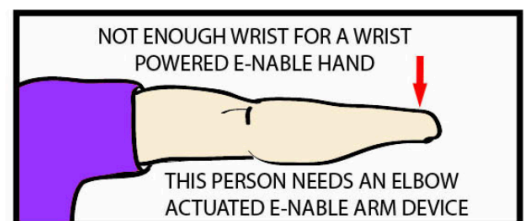
Participants
Group of 35 native and non-native speakers—between de ages of 15 and 65 years old—who are involved in the prototyping and making of 3D open-source prosthetics, some coming with an empirical understanding of design and problem-solving frameworks while others have no knowledge of design principles.

I have been working with this community in developing a visual language to 1. Develop skills-and-competencies digital badges that are recognized by higher educational institutions around the World as college credits, and in the professional world as proof of built skills and competencies to perform in the workforce, and 2. To develop a common language that allows kids, parents, and engineers understand one another when talking about problems and solutions. Since the community is spread around the globe, English—technical language—is used as a Lingua Franca to be able to communicate effectively; however, the technical language is still missing in these conversations. Here are some of their designs:

WRIST POWERED DEVICES REQUIRE A FUNCTIONAL WRIST

AND ENOUGH PALM TO PUSH AGAINST THE DEVICE

WHICH DEVICES WILL WORK BEST FOR THOSE WITH A FUNCTIONAL WRIST AND PARTIAL PALM?

NOT ENOUGH WRIST FOR A WRIST POWERED E-NABLE HAND

THIS PERSON NEEDS AN ELBOW ACTUATED E-NABLE ARM DEVICE

Phoenix Hand by e-NABLE Assembly Materials Kit

Curriculum

I am developing a **4-stages series of workshops**—2 onsite (parts I and IV) and 2 online (parts II and III)—to **build a visual and technical language**, conceptualize badges (the skills/competencies supported by each badge, value in terms of college credit and professional level of expertise) using **visual semiotics** (icons, symbols, indexes), and produce the digital badges supported by Blockchain verifiable system; the 4th stage will happen as a face to face gathering were the community will review, comment on, test, and select final badges. The aim of this workshop is to introduce participants to a co-design/participatory framework, which will allow them to develop digital badges for their own e-NABLE community as being experts in the community's needs and culture. The conference brought together a group of people from all

over the world who have had interactions online, in sharing open-source resources for prosthetics modeling and 3D printing; however, most participants have never met in person, and the workshop served as a space to socialize, build rapport, and foster collaboration beyond resource-sharing. The 3 learning objectives I have chosen frame the workshop's dynamics, activities, and assessable tasks where I am using informal formative assessment "for learning" (Katz, p. 1); these types of assessments also serve as practice for participants to solidify new knowledge.

Learning Objectives	Learning Activities	Assessments
1. Apply their background knowledge to generate a list of competencies, skills, and behaviors relevant to the e-NABLE community	**Brainstorming** Teams of 3-4, participants write a list of 5-6 hard/soft skills. In teams of 4, participants discuss their lists and narrow them down to 4-5, written in a post-it note and place on the wall to share. As a class, participants look at all lists and start creating clusters (group of skills that together build a specific competency), i.e. design, prototype, produce, iterate, IRB = MAKER	**Informal Diagnostic assessment/teacher observations** Group oral conversation to discuss participants' understanding of hard/soft skills and how a group of skills build up competencies within the community
1. Pair visual examples of icons, symbols, and indexes connected to the e-NABLE community's skills, competencies, and behaviors	**Word/image map** Popplet exercise and presentation to introduce keywords using visual examples while orally elicit examples from students' everyday experiences **Worksheet**	**Informal formative assessment**/ teacher lists examples of a white board

PARTICIPATORY Co-design:
Language focus (ESP)
- **Workshop, Part I:** List of skills and competencies that emerge from the group
- **Workshop, Part II:** Visual vocabulary based (design theory/semiotics)
- **Workshop, Part III:** Technical vocabulary within the fields that collaborate (makers, engineers, 3D printing materials, equipment and software)

Here, I will share **Parts I** and **II**—integrated language unit—in which participants started pairing skills and competencies that emerged from a brainstorming exercise based on their experience as community stakeholders, and paired those produced skills and competencies with visual imagery, based on the design theory of visual semiotics (icons, symbols, indexes).

LESSON PLAN
Online, open source platforms:
Popplet: online open source platform that allows for synchronous and asynchronous

collaborations in mind/word mapping; it allows a variety of media (soundbites, videos, images, drawings, text).

pollseverywhere is a platform that allows to set up different types of polls for participants to respond, in real time, via text message.

Exercise 1:
45 min.

COMPETENCIES AND SKILLS produced at the beginning of this workshop as reference point to activate background knowledge/schema
(SAMPLE)

TANGIBLE (hard)	INTANGIBLE (soft)
making	empathy
research	passion
mechanics	collaboration
*IRB	adaptability
Public speaking	advocacy
engineering	open-mindedness
testing	outsourcing
assembly	commitment
printing	respect

Table 1

[*] These are words that become part of the master vocabulary developed in part III, of a common technical language in this multi-disciplinary field.

Activating Schema orally: 5 min. (list of examples)
After introducing the importance and purpose of digital badges for the community, I, orally, elicit examples of what participants believe to be important skills, competencies, and behaviors in their community; I annotated these examples on a white board.

Intro: 10 min.
I then explain the difference between **competencies and skills as hard/measured** and **behaviors as soft/acted**.

Task: 15 min.
After this introduction, I ask participants to find people they don't know and self-organize, in groups of 3-4. I provide post-it notes, which are color-coded: orange for skills, pink for competencies, and blue for behaviors. In 10 min. each group produces as many words as possible (one per post-it note); when the 10 min. are up, they post on a wall what they generated, following the color-coded system (clusters).

Diagnostic assessment for understanding (orally): 15 min.
(re-organize post-it notes and produce more)
We have a 15 min. discussion for each group to explain their selections, and for others to ratify or recommend a different cluster for a particular word (skill, competency, behavior); *for instance, being able to design the mechanics of a hand (drafted on paper) is a skill, but the act of designing encompasses not only drafting but also assembling, and producing; in this case, the word "design" is deconstructed in its components: drafting (skills), assembling (skill), producing (skills), and together, these 3 skills build a competency (designing).*

SKILL	COMPETENCIE	BEHAVIOR
Drafting		Collaboration
Producing	Designing	Open-mindedness
Assembling		Passion

Table 2

Why this assessment?
I document this assessment by taking photographs before and after the discussion to be able to assess their understanding while in their groups and the shifts that happened while in open conversation.

[10 min. break] During the break, I make a table of the words produced (table 2) to project on screen as reference for the next exercise.

Exercise 2:
45 min.

Intro: 10 min.
I introduce a short description of visual semiotics, a design theory used in design to categorize ideas and concepts into different types of visual representations; we will concentrate on the meaning of ICONS, SYMBOLS, AND INDEXES. I provide visual examples of the everyday to illustrate meaning.

Task
Interpolate: 20 min.
I setup a Popplet account before the workshop and send an invitation for participants to register as collaborators. Now, they log-in and work in teams of 2-3 (all team members in one computer) to match skills, competencies, and behaviors (table 2 projected on white screen), with images found on the internet, or drawings they do on Popplet. Then, each team shows their Popplet production, on screen, to share with the rest of participants and have an open discussion.
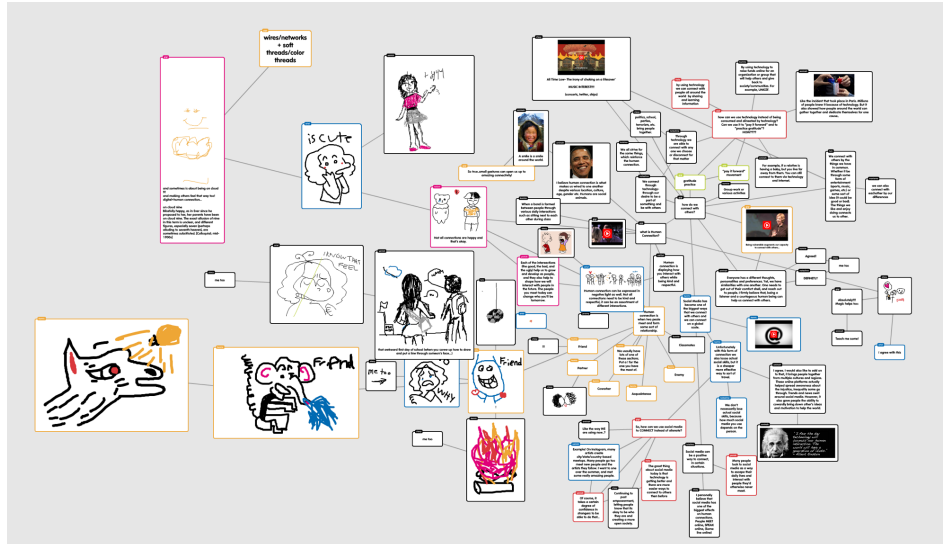
Performative assessment
Sprint process: 15 min.
Individually—looking at skills, competencies, and behaviors list—categorize each as an icon, symbol, or index.

Icon, symbol, or index	SKILL	Icon, symbol, or index	COMPETENCIE	Icon, symbol, or index	BEHAVIOR
	Drafting				Collaboration
	Producing		Designing		Open-mindedness
	Assembling				Passion

Table 3: worksheet

Then, in groups of 4, participants sketch badges ideas, and select one sketch to create using provided materials (papers, 3D pieces, markers, etc.). Each team presents their design and explains the reasons behind their decisions.

Self-assessment
Students self-assess their understanding of the material, and the workshop effectiveness, using pollseverywhere.com, in order to preserve anonymity so participants feel more at easy when answering these questions.

I was able to:

	5-7	8-12	More than 12	How do I feel about my performance?
1. Produce skills, competencies, and behaviors during the brainstorming exercise				
2. Pair visual examples of icons, symbols, and indexes connected to the list of skills, competencies, and behaviors produced in exercise 1				
3. Complete the worksheet provided in exercise 3				

Workshop assessment
The workshop was effective in:

	agree	neutral	disagree	How did it make me feel?
1. Active background knowledge				
2. Practicing the participatory co-design framework				
3. Teaching me new design theories				

The workshop was:

	agree	neutral	disagree	How did it make me feel?
1. Well organized				
2. Properly scaffolded				
3. Relevant in content connected to everyday experiences				
4. Well-paced in time allocations				