

# **Two-Generation Design Project:**

**Uncovering new approaches to Advanced  
Manufacturing workforce development**



**D E S I G N  
I M P A C T**



Credit: Bernard Hoffman

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*\*The purpose of this case study is to share the application of human centered design to a complicated social issue and to report the outcomes and learnings from this work.*



# The Problem

## Recruiting and retaining women in Advanced Manufacturing

In Northern Kentucky, manufacturing jobs are in high demand and manufacturers face a major skills gap in the competencies and qualifications of the local labor pool. An aging workforce and a non-existent talent pipeline only magnify the problem. In addition, there is also a poor representation of women in this field, despite high poverty rates and the potential to earn self-sufficient wages.

In 2014, Gateway Community and Technical College created Raise the Floor (RTF), a female-oriented career program in advanced manufacturing. While RTF was designed to meet the needs of women, **the program had not experienced tremendous success recruiting or retaining students; particularly mothers experiencing poverty.**

Reliable childcare and transportation were potentially standing in the way of these women's success, and most often children are perceived as barriers for women trying to enter the workforce. Local leaders recognized that it was time for a different approach and a deeper understanding of this complicated problem. The team was interested in discovering how children could become motivators rather than inhibitors to their mother's success, and wondered how programming could consider the needs of the entire family and inspire interest in STEM careers early on.

# Project Background

## Organizational collaboration and project scope

From May 2014 - April 2015, United Way of Greater Cincinnati (UWGC), Partners for Competitive Workforce (PCW), Design Impact (DI) and Gateway Community & Technical College partnered to uncover new ways to increase the number of women pursuing and succeeding in advanced manufacturing (AM) careers in Northern Kentucky. With a focus on developing two generation approaches, the project also looked at ways to spark interest in STEM learning among children whose parents were moving through an advanced manufacturing career pathway.

Funded by UWGC and the Ascend Fund at the Aspen Institute, the unique directive of this work was to apply design thinking to understand why more women with families are not choosing well-paying, in-demand jobs despite a certification program developed by Gateway.

Design Impact, a Cincinnati based social innovation and design firm was brought on board to lead partners and a large group of stakeholders through the design process, which included deep research, ideation sessions, and prototyping potential solutions to gain crucial feedback. A key tenet of the design process is that the problem is defined not by potential solutions but by a big bold question. In this case, the question became:

**How might we involve the whole family to increase the number of women in advanced manufacturing careers and increase participation in STEM learning among their children?**



Credit: "Photo Dudes"

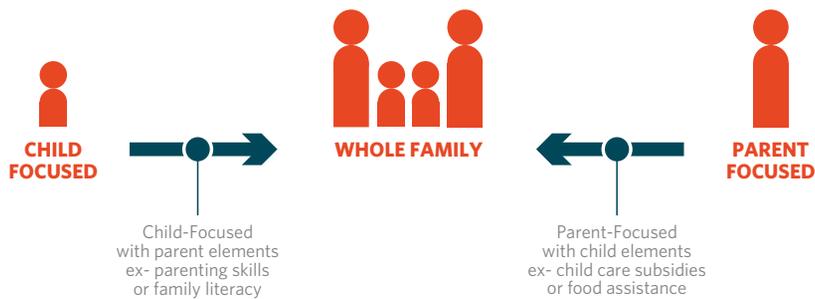
## Partners



# Design Thinking Process



# Two-Generation



Graphic taken from [Ascend at the Aspen Institute](#)

The following pages provide an outline of methods and findings that emerged during each phase of the design process: **Discovery, Synthesis, Ideation, Prototyping**

# The Approach

## Innovation process that considers the entire family

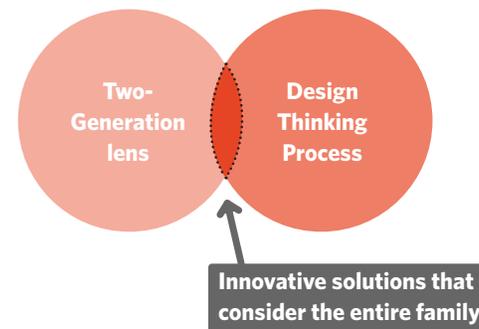
### What is Design Thinking?

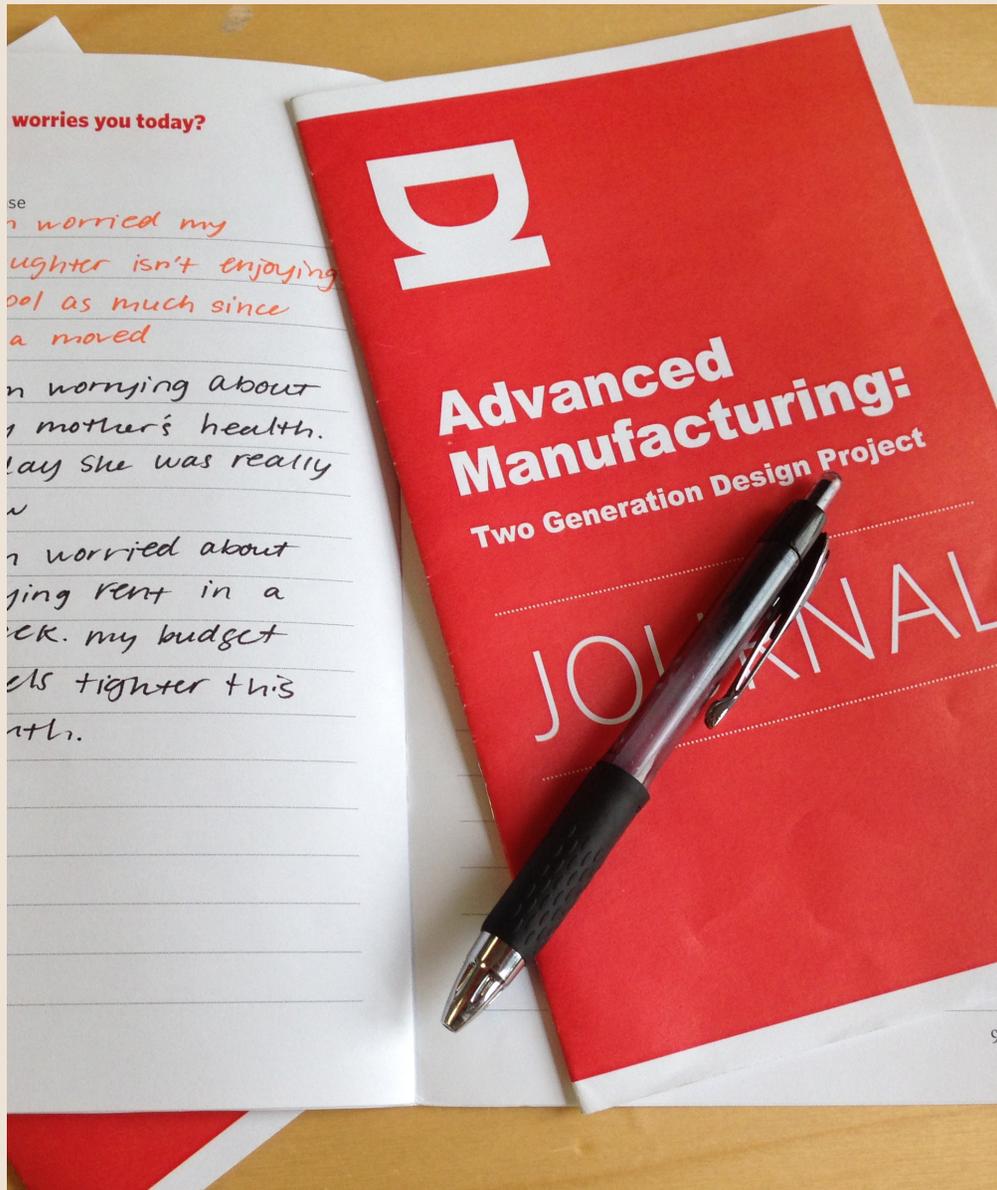
Design thinking is a process that employs empathy, creativity, and rationality to define, explore and solve problems. The design thinking process focuses on understanding and building empathy with users, considering divergent possibilities and learning through action. The design process is iterative so that despite various phases of action, individuals are encouraged to continue questioning, uncovering information, and testing ideas. The process includes:

- Discovery
- Synthesis
- Ideation
- Prototyping

### What is a Two-Generation Approach?

The Aspen Institute considers Two-Generation approaches to poverty to be programs, policies, systems or research with a “focus on creating opportunities for and addressing needs of both parents and children together.”





# PHASE 1: Discovery

## Starting with Empathy

Design Impact and project partners spent three months moving through a rich discovery process that involved deeply exploring the lives of women and their families in an attempt to better understand both the real and perceived barriers that prevent women from pursuing careers in advanced manufacturing. In order to keep an open mind and identify new potential opportunities for innovation, Design Impact encouraged the team to embrace design principles such as:

- Listen and observe
- Engage many voices
- Avoid assumptions
- Maintain child-like curiosity

### Interviews

Teams of two worked together to conduct over 40 empathic interviews; a design practice rooted in relationship and deep engagement with the topic. In some instances where relevant, interviewers spoke with children about their relationship with their mother's work and education and with math and science. In addition to conversation, the team asked mothers to journal throughout the day and to sketch and draw a journey map that represented her past, present and future. In addition to women, the team spoke to:

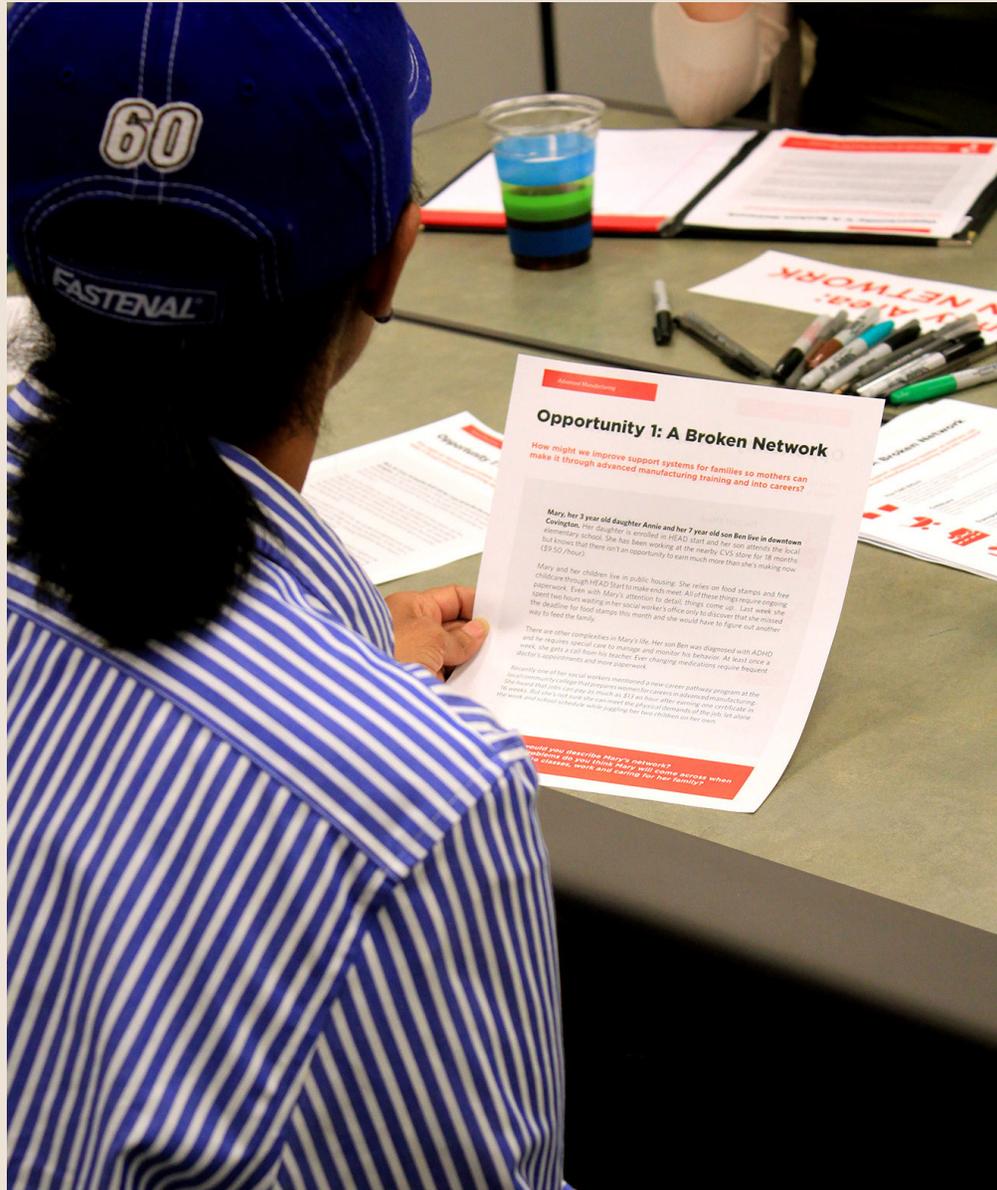
- Advanced Manufacturing instructors
- high school teachers
- social workers
- administrators
- employers
- organizations around the country.

Discovery

Synthesis

Ideation

Prototyping



### Observations + Research

Aside from interviews, Design Impact used the practice of observation to understand other barriers, such as enrollment and transportation barrier. Team members rode the bus from downtown Covington to a manufacturing facility and spent time in classrooms and manufacturing facilities.

The team also conducted a literature review on the topics of STEM education and workforce development, and studied women-focused workforce development programming around the country, including CAP Tulsa's Career Advance™ and Climb Wyoming.

Carissa Schutzman, Dean of Workforce Solutions and creator of the Raise the Floor Program at Gateway had this to say about design thinking and it's deep involvement of women throughout the process:

***“Design thinking made a difference because it encompassed the experiences and opinions of the women who are currently in the Raise the Floor program as well as women who may potentially enroll in the program. Unlike other processes that often treat members of a group as passive subjects, the design thinking approach is respectful and inclusive of the target population for the RTF program.”***

Discovery

Synthesis

Ideation

Prototyping

# PHASE 2: Synthesis

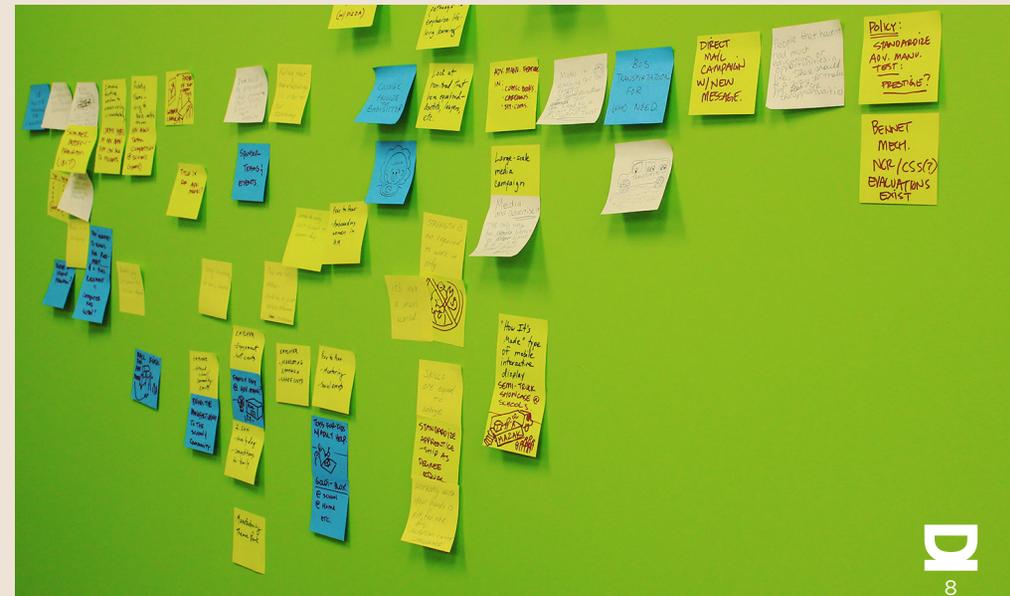
## Identifying patterns in the data

During this phase, the team applied best practice design principles such as:

- Make the data visual
- Identify themes
- Be comfortable with ambiguity

One of the trickiest parts of the design process is to make sense of hundreds of data points with the intention of identifying key opportunities for innovation. This part of the process is often a bit messy and requires the group to stay positive, remain open to multiple possibilities, and maintain the belief that the right avenues will emerge.

By applying varying tools and methods such as forced ranking, quadrant mapping, and gut checks, DI and project partners began to understand which of those things that were heard, seen or felt could lead to new ideas around change.



Discovery

Synthesis

Ideation

Prototyping

## Opportunities

During the synthesis phase, the team identified four major opportunity spaces--or places ripe for innovation--outlined here:

### Broken Network

"How might we improve support systems for families so mothers can make it through advanced manufacturing training and into careers?"

### Change the Story

"How might we change the negative perceptions of advanced manufacturing careers and highlight the positive?"

### Preparing Women

"How might we prepare women for the particular challenges and opportunities associated with advanced manufacturing careers?"

### Preparing Advocates

"How might we better prepare frontline workers to understand careers in advanced manufacturing and match women to career opportunities?"

Discovery

Synthesis

Ideation

Prototyping



Credit: Simon Fraser University



# PHASE 3: IDEATION

## Moving from opportunities to concrete ideas

During this phase, the team applied best practice design principles such as:

- Immerse in the research
- Engage diverse voices
- Keep an open mind
- Stretch the imagination

Ideation is the phase of the design process where new ideas are generated. These ideas may be big, small, wild, or even just a twist on an old way of doing things. No matter what the ideas are, Design Impact believes that all ideas should stem directly from those individuals who are a focus of impact. In order to ensure representation of all stakeholders, Design Impact, with the help of its partners, brought together 24 participants in a single four-hour ideation session.

The purpose of the session was to:

- Create an open and creative environment where all ideas and voices could be heard
- Share distilled learnings from three months of Discovery work
- Convene diverse teams of participants to generate ideas in each opportunity area

This group of women, mothers, social workers, educators, designers and workforce development professionals were prompted and led through a creative experience that resulted in nearly 100 ideas. These teams then identified the top 20 ideas in the session. DI and partners later reviewed and refined these ideas. Nine ideas, some two generation concepts and some categorized as critical support (not 2-Gen ideas but ones that are necessary improvements), emerged.

**It is important to note that the inclusive nature of this process engaged the voices of those that are often left out of the decision-making table. This focus on participatory practice ensured that all ideas were steeped in truth and real-life experiences of the people most affected by the workforce development system.**

Discovery

Synthesis

**Ideation**

Prototyping



Credit: U.S. Department of Agriculture



Credit: U.S. Department of Agriculture

Discovery

Synthesis

Ideation

Prototyping

## The Top Ideas

### Two-Generation

**The Program Blue Print and the Study Cube** are life management tools that allows both parents and children to set academic, financial and household goals, look forward to mutual celebratory moments and develop contingency plans for future emergencies.

**Peer Support** is ongoing system of peer meetings that deepen and expand relationships and resources amongst a cohort of women in the Raise the Floor program.

**The Family Camp** offers condensed summer coursework for parents working towards certifications in advanced manufacturing, coupled with an academically enriched STEM camp for children.

**Onsite Childcare** suggests that childcare facilities should be co-located on campus or near employers, perhaps through a partnership and expansion of existing daycare centers.

### Critical Support

**Build the Brand** mandates that the manufacturing sector construct a consistent brand story that better communicates the exciting careers and benefits of advanced manufacturing--from kindergarten through employment.

**The Advocate's Toolkit** is a collection of easy-to-use and relevant tools that frontline workers (teachers, social workers, career advocates) can use to communicate about the sector.

**Tour the Trade** suggests that frontline workers receive immersive experiences in actual manufacturing facilities to help them comprehend the demands and skills of AM.

**Alternate Work and Study** outlines pathways for women to alternate work and school by completing a semester in the classroom followed by a semester in the field (allowing students to earn money while also gaining relevant career experience and a degree).

**My Emergency Fund** is a fund that exists to help women stay on track. Through a simple qualification process, women can access small amounts of funds immediately to address or prevent the crises that are so-often disrupt success (i.e. flat tire, heat bill, need for food).



## More synthesis

Design Impact and partners determined which of those 9 ideas should be built and tested based on the feasibility of building a model within the scope of the program and on having committed partners for execution. The 5 ideas below were refined with the intent to build iterations and test.

- The Program Blueprint and the Study Cube
- Peer Supports
- My Emergency Fund
- The Advocate's Toolkit
- The Family Camp

Below a Mazak apprentice and student at Gateway, Elizabeth Schneider, had this to say about lending her voice as the group developed ideas.

***"I think the process that Design Impact took was the only approach that can work. Women in manufacturing is not a very popular thing these days, it never has been. So, the only way to figure out how to make it appealing was to get those women together and brainstorm. After leaving the ideation session I felt empowered; I had no idea that my opinion could make such a difference. I didn't even think that being a woman in manufacturing made me special. But after speaking with everyone in the group I knew what we were doing was going to make some big changes! It was great for me to be able to give my input."***

Discovery

Synthesis

Ideation

Prototyping

# PHASE 4: Prototyping

## Moving from Ideas to testable models

During this phase, the team applied best practice design principles such as:

- Build inexpensive mockups
- Capture feedback from stakeholders
- Celebrate learning and failure
- Test multiple versions

In the prototyping phase, key ideas are built into quick mock-ups in order to understand how that idea might work in-context. Prototypes might be simple tests of a service or a bare-bones physical model, but they always are used to get feedback from users to uncover which ideas are worth pursuing and which might need refinement.



Discovery

Synthesis

Ideation

Prototyping



# YOUR PROGRAM BLUEPRINT

# 1 Program Blueprint and Study Cube

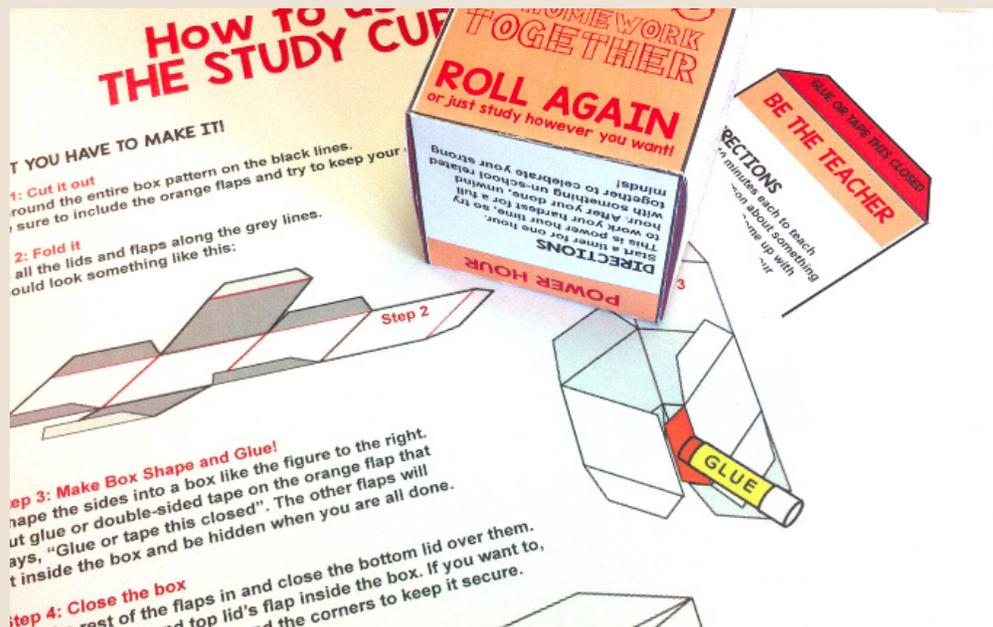
## The Brief

The Program Blueprint was created in response to the desire for a time management and contingency planning tool. The Blueprint allows parents to set both short term and long term goals related to academics, finances, employment and family. In addition, the Blueprint provides the family an opportunity to identify mutual celebratory moments and to prepare for changes to homelife that arise when a key member of the household pursues a new career.

The purpose of the Study Cube is to bring children into the mother's own educational experience. The Study Cube provides a series of activities the family can do together at home that reinforce the real application of science and math in advanced manufacturing.

## Prototype Status

The Blueprint and Study Cube were introduced at the first peer support meeting as part of the Raise the Floor Program at Gateway. DI and Gateway will evaluate the usability of these tools by checking in with women at each peer support meeting. The team also administered a survey pre and post program that looks at the student's relationship with her classmates, her comfort level in planning for emergencies, and the level of involvement of her family in her studies.



Discovery

Synthesis

Ideation

Prototyping



Discovery

Synthesis

Ideation

Prototyping

## 2 Peer Support

### The Brief

One of the guiding principles of two-generation approaches is social capital. In the team's research, it was apparent that not only do women need tremendous support to begin a post-secondary education; they need this support to thrive in the advanced manufacturing sector. Gateway had also identified a need to create a peer structure but lacked clarity on how this group should function. With the input of women enrolled or planning to enroll in the Raise the Floor program, the team developed goals and curriculum for these mandatory gatherings. The peer support meetings:

- Build relationships among the women so that they may lean in to one another.
- Create an opportunity for women to gather more information about careers and the educational and financial implications of particular jobs within the industry.

### Prototype Status

Gateway kicked off the first peer group with its February 2015 cohort of women in the Raise the Floor program. Currently the team is evaluating the frequency of those meetings and exploring other ways women can connect outside of the classroom (i.e. online). The peer groups will be evaluated through pre and post experience surveys that will look at the woman's relationship with her classmates and her comfort level with making important career and education decisions.



Credit: Matt MacGillivray

Discovery

Synthesis

Ideation

Prototyping

# 3 My Emergency Fund

## The Brief

My Emergency Fund was a concept Gateway had considered but had not implemented prior to working with Design Impact. The research and findings validated the need for this resource. This small fund is available to women enrolled in Raise the Floor for crisis that be mitigated with a small amount of money. The intention of this fund is to provide economic support for the woman and her family so that her education remains on track and she can continue to pursue and succeed in her career.

## Prototype Status

Gateway has been testing the emergency fund since February of 2015 and three women have been able to take advantage of this resource. One woman took a job in advanced manufacturing that paid \$14, therefore eliminating her eligibility for childcare assistance. However, this wage is not adequate for her family to become self-sufficient, so she requested support through My Emergency Fund. The emergency fund has also been used to subsidize transportation expenses as well as to purchase laptops, as much of course work is online.



Credit: US Department of Labor

# 4 The Advocates' Toolkit

## The Brief

Through time spent with high school teachers and social workers, it was apparent that many of these individuals lack an understanding of the realities and the potential career opportunities of the manufacturing sector. These players are critical informants to women on career and training opportunities. Frontline workers need exciting and relevant tools to communicate about these careers. A tool kit equipped with creative elements, or some other experiential artifact to jog the advocate's memory, can help individuals become advocates for these careers.

## Prototype Status

Although there is desire and commitment to develop this prototype, it currently lacks funding for further development. However, as a result of this work Gateway did develop a workshop called "Get to Know Raise the Floor." This workshop provides an opportunity for both women interested in the program and frontline workers to take a tour of the Gateway facility and manufacturing sites while learning more about what is required to succeed in this field.

Discovery

Synthesis

Ideation

Prototyping



Credit: "saritarobinson"

Discovery

Synthesis

Ideation

Prototyping

# 5

## The Family Camp

### The Brief

The Family Camp involves condensed summer course work for parents working towards certifications in advanced manufacturing, coupled with an academically enriched STEM camp for children. This concept promotes mutual learning and shared excitement for science, math, engineering and technology.

### Prototype Status

Although there is desire and commitment to develop this prototype, it currently lacks funding for further development. Gateway did start STEM camps for young women in high school in 2014 and 6 of those attendees enrolled in Raise the Floor in February 2015 - earning college credits and a series of certifications while completing their high school diplomas. This serves as evidence that exposure to applied STEM learning can spark interest in advanced manufacturing careers.



## Other Results

### The unintended consequences of design thinking

In addition to 5 concrete ideas the partners decided to move forward and test, there were several other outcomes from this work.

#### Transformation at Gateway, our implementing partner

First, Gateway enacted some notable changes to the RTF program and the student experience. In addition to the RTF workshops designed to excite potential students prior to enrolling, staff now interviews women prior to registration and enrollment to ensure that individual is prepared and capable of succeeding. This interview does not just consider her academic readiness but other factors in her life such as reliable transportation, childcare, financial stability and the social capital needed to succeed.

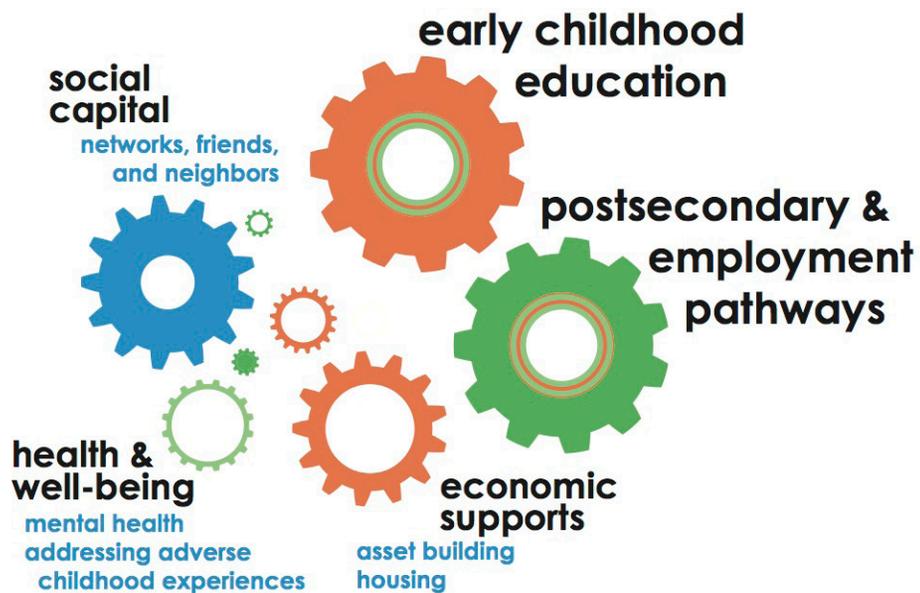
#### Mindset Shift

Second, there was notable mindset shifts from project partners after engaging in the design process over the course of 10 months. Below Stephen Tucker, Senior Manager of Industry Partnerships at PCW, explains how the work transformed him.

“My work with Design Impact has had a tremendous impact on me personally and professionally. Just this morning I was in a meeting with discussing strategies to serve opportunity youth and I stated that we should use the human centered design approach we learned from DI.”

#### Systems Innovation

Third, the core team recognized that these five prototypes addressed program attraction and retention. But there were other important and deep insights that were uncovered that indicate opportunities for **broad, systemic collaboration** among childcare institutions, workforce development agencies, employers, the social service sector, government and funders. With complicated, wicked social problems such as this, there is not one single solution but rather the need for coordinated efforts among many different players and organizations. We explore some of these learnings on the next page.



Graphic taken from [Ascend, of the Aspen Institute](#)

# Systemic Learnings

## Broader issues ripe for change

Many of the women we spoke to were facing issues that highlight the larger gaps in our region's social service and educational systems. Although they may not represent new information to readers of this report, we think it important to note these learnings here as opportunities for wide scale, systemic improvement that could address some of the foundational challenges that inhibit a woman's transition from underemployment to self-sufficiency. In short, we believe our region can, and should, take a hard look at these areas:

**COORDINATE SERVICES:** How might we better connect workforce development educators and coordinators with a woman's other support service workers so that she has a team of champions who are coordinated? How might we build stronger connections with childcare to link parents with children in quality childcare to career pathways that can lead to self-sufficiency?

**RELATIONSHIPS MATTER:** How might we reduce the number of support workers a woman has in her life? How might someone in her life know the cumulative effect of her challenges and successes—rather than a series of people each knowing one part?

**MONEY MATTERS:** How might we design programs that allow women to earn money, care for their families, and work towards higher wage jobs at the same time?

**WORK WITH THE WHOLE FAMILY:** How can we create post secondary and employment experiences that acknowledge the complexities of the entire family?

**CLIFF EFFECT:** How might we bridge the financial gap between when a woman loses specific subsidies before she begins earning family-sustaining wages?



# Thank you!

## A collective effort

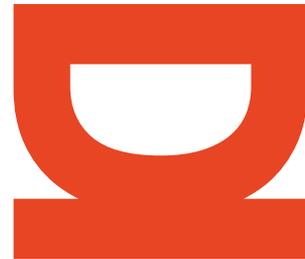
Thanks to the **United Way of Greater Cincinnati** and the **Ascend Fund at the Aspen Institute** for funding this important and exciting work. In addition **Gateway Community and Technical College** and **Partners for a Competitive Workforce** were the key leaders in propelling this project forward. We also appreciate the help of Rachel Griner in initial project scoping and process evaluation, as well as **Design Thinking Cincy**, who provided volunteers during the Discovery phase.

Finally we'd like to thank the many individuals who contributed their time, thoughts, experiences, knowledge, and opinions to this project. We hope that the creative and participatory practice used here can continue to spark improvements in existing services and inspire new pathways to gainful employment for women and their families.

If you have any questions about this report or are interested in learning more about this work, please contact:

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