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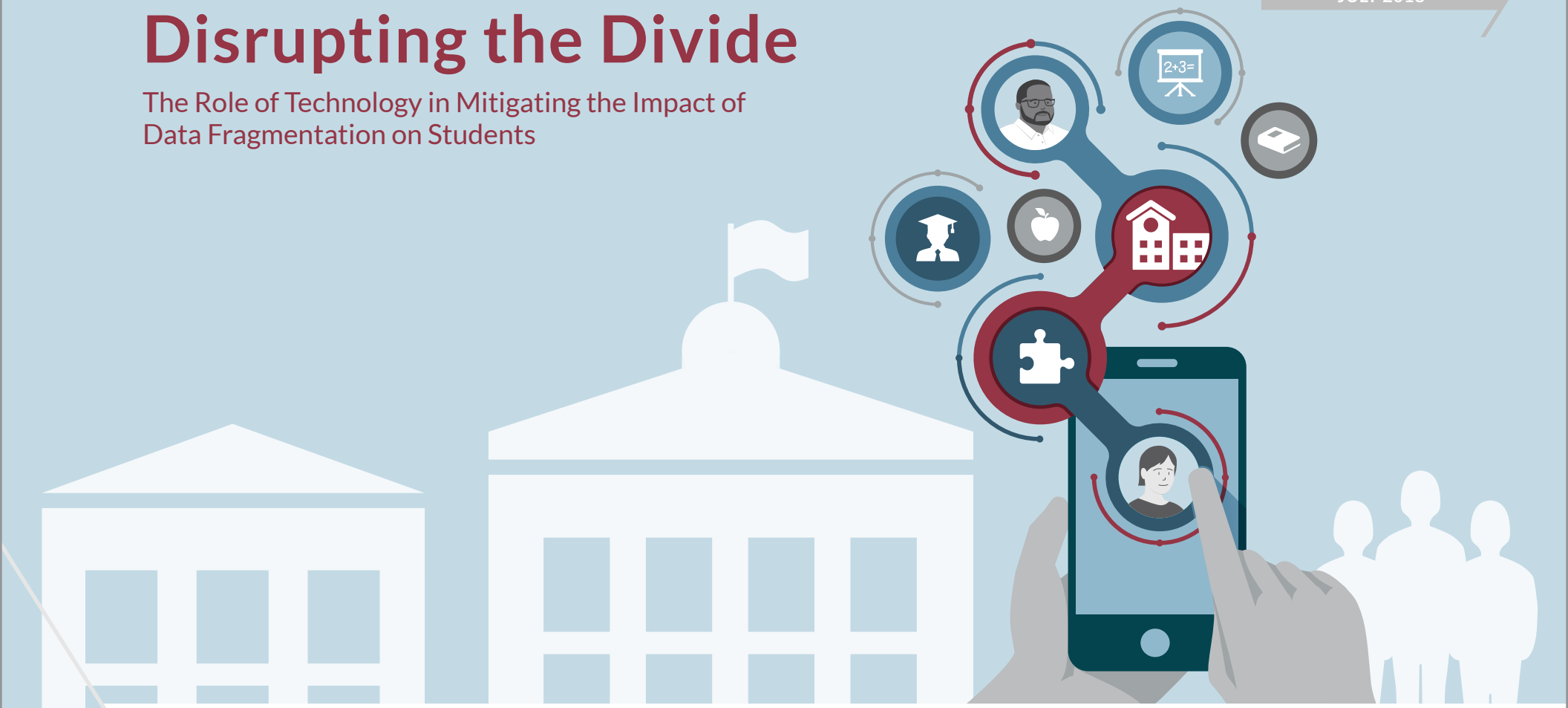
Disrupting the Divide

The Role of Technology in Mitigating the Impact of Data Fragmentation on Students



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BELLWETHER
EDUCATION PARTNERS

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Introduction

The millions of students experiencing significant disruptions to their education are among the most invisible and underserved in our educational systems today. Many of these students may have experienced homelessness, a foster care placement, an incarceration, or an unmet mental or physical health need. These young people receive vital support from a number of government, nonprofit, and community- and faith-based organizations while simultaneously working with a number of advocates like case workers, social workers, teachers, probation officers, judges, and others.

In most places, these individuals and organizations operate in siloes and this fragmentation can prevent young people from accessing the resources and guidance they need, even where high-quality programs and supports exist. Students themselves express frustration with navigating these systems and working with so many people across agencies and services. One fundamental problem is that organizations and individuals all carry different pieces of information about these youth — one organization is aware of the student's attendance records, another is aware of the student's past foster care experience, and another knows what mental health supports the student requires.

While these individuals and organizations act with the best intentions, existing technologies and practices, like siloed funding streams and overly restrictive privacy policies, prevent true collaboration.

While technology will not solve this problem, it certainly can help mitigate the impact of this fragmentation felt by young people.

In February 2017, Bellwether Education Partners gathered several experts in a working session to identify the biggest challenges for youth experiencing education disruption and to

design a new vision for how technology can help young people overcome those challenges or avoid them entirely. Participants included data strategists from school districts, data scientists and engineers, application developers, data advocates, nonprofit organizations, and a youth specialist on a state board of education. Combining their collective technical expertise and experience in working with youth, participants defined the issues and brainstormed focused solutions by combining current best practices and innovative thinking to describe an ideal future state. The group's goal was to create an aspirational vision — one that is both ambitious and realistic.

In this report, we first walk through a journey map of the current state of the student and adult experience during a moment of education disruption. We then describe a single design for an online data-sharing platform that captures the working group's aspirations while remaining grounded in the tangible and practical. Finally, we discuss important considerations for any leader who is considering implementing this kind of technology solution.

This publication centers on three "personas" — archetypes based on interviews and research that serve as stand-ins to better understand the experience of real people: the student, the student's advocate, and the jurisdictions between which the student is transitioning. The journey map illustrates how these three entities currently engage with one another, including the challenges the student and advocate face in navigating complex bureaucracies.

This report uses our model tool — we've named it ContinuityCounts Services — as an example of a resource that will:

- Streamline access to student records for the right people.
- Guide and streamline access to support services and interventions.
- Empower students to advocate for themselves.

Our tool is, of course, not the only version of a technology intervention that would meet these three needs. It is provided here as an illustration and as inspiration. As state education agencies and their chief information officers evaluate their current practices and innovate for the future, we hope they will consider these approaches. We also hope that as advocates, community organizations, and other state agencies consider new approaches to cross-system coordination, they may find a shared vision in this report.

While this work aims to harness the power of technology to mitigate the effects of fragmentation, technology is not itself a solution for young people. To maximize our ability to resolve the challenges youth in transition face, that technology must integrate into a comprehensive systems change of social service agencies, policies that govern data and information sharing, and the people who serve youth every day.[1]

1 See Bellwether's recent publication, Continuity Counts: Coordinated Education Systems for Students in Transition, to learn more about our larger body of work on youth in transition.

Foundation

This section provides the foundational principles, people, and actions that should inform any potential solutions to improving educational transitions for vulnerable students. Regardless of any final product's specifications, a design should follow these guidelines.

Design Principles

These high-level principles guide the detailed design decisions summarized in the following pages. They focus on and inspire creative thinking and provide constraints on how to approach solutions.

PRINCIPLE 1

Streamline Access to Records

Respect and protect student privacy

The system should respect federal, state, and local privacy rules and, by default, err on the side of protecting privacy.

Integrate systems

Connect major agencies so they may freely and digitally share records in accordance with a Memorandum of Understanding.

Simplify adding information

Not all information can be gathered from integrated systems. Allow users to easily add this information through uploads, photos, or easy-to-use digital forms. Where possible, expedite the consent form process using digital signatures.

PRINCIPLE 2

Guide and Streamline Support

Highlight opportunities for intervention

Use analytics to identify gaps in records or highlight situations requiring the intervention of the advocate.

Suggest services

Use algorithms to help students find services based on those they currently receive and their self-reported interests/goals.

Check for bias

Algorithms reflect the biases of the people who created them. Continually check and recheck that supporting algorithms don't reinforce negative stereotypes.

PRINCIPLE 3

Empower Students to Advocate for Themselves

Transparency

Allow the student to see and add context to their records.

Storytelling

Allow the student to add personal context. They are individuals, not just cases or a task in an advocate's* to-do list.

Elevate

Build on a student's successes, no matter how small.

** We use "advocate" as a general term to represent social workers, case workers, and others who are primarily responsible for supporting the student through education transitions. We have intentionally selected the word "advocate" to reinforce that the work is in service of people rather than the management of cases.*

Personas

Personas are memorable, engaging, and actionable portraits that represent users' goals, not real people. Employing the use of personas allows us to better imagine solutions to meet their goals. These personas describe our primary users who might benefit from a student data tool.

Emma – Student

Emma is a 10th-grade student in foster care moving to a new school district. During her time in the foster care system, Emma has moved many times. Her mother is incarcerated, but Emma tries to stay in touch. Emma dreams of becoming a doctor and has musical talent. She's received detentions and has had trouble with attendance.

At the time of her transition, Emma was taking medication to treat ADHD, seeing a psychologist, and attending an LGBTQ support group. She also had an individualized education plan to address her special education needs. She has a mobile phone with limited data and uses a desktop computer at school.

Goals

- Get credit for coursework already completed.
- Maintain continuity of support for her mental health needs.
- Find opportunities to pursue her dreams and hobbies, like music.
- Have a sense of control and know what's going on.

Dale – Advocate

Dale is a social worker at a public agency in the jurisdiction Emma is transitioning to. In addition to taking on Emma's case, Dale has been assigned five new students this week and handles 25 other cases. Dale doesn't have a lot of information about Emma, so he's not sure what the best plan is for her. His agency needs to abide by all federal and state privacy statutes relating to each youth's education, health, and other personal records. Dale has both a laptop and a mobile phone, and he's often on the go.

Goals

- Understand what Emma needs to be successful.
- Help Emma get enrolled in school.
- Make sure Emma's school:
  - Enrolls her in the right classes.
  - Has access to special education or other records, if they exist.
- Find appropriate support and/or program services for Emma.
- Work efficiently so he has time for all the students he serves.

Jurisdictions

Jurisdictions might be states, counties, cities, or school districts.

In the jurisdiction Emma is moving from, the state had a central statewide longitudinal data system (SLDS) for analyzing anonymized student data. Some districts' student information systems (SISs) integrate with the state system, but some — like her most recent school district — don't. In that jurisdiction, the data systems used by the foster care, juvenile justice, and other youth-support agencies are not integrated with each other. Though legal memoranda exist to allow some organizations to share data, the policies are not widely understood. Investing in technology to streamline sharing data is not a priority.

In the jurisdiction that Emma is transitioning to, the agency leaders are piloting a student data tool developed by the state. Dale has been using it for a few weeks; it's already improving his workflow.

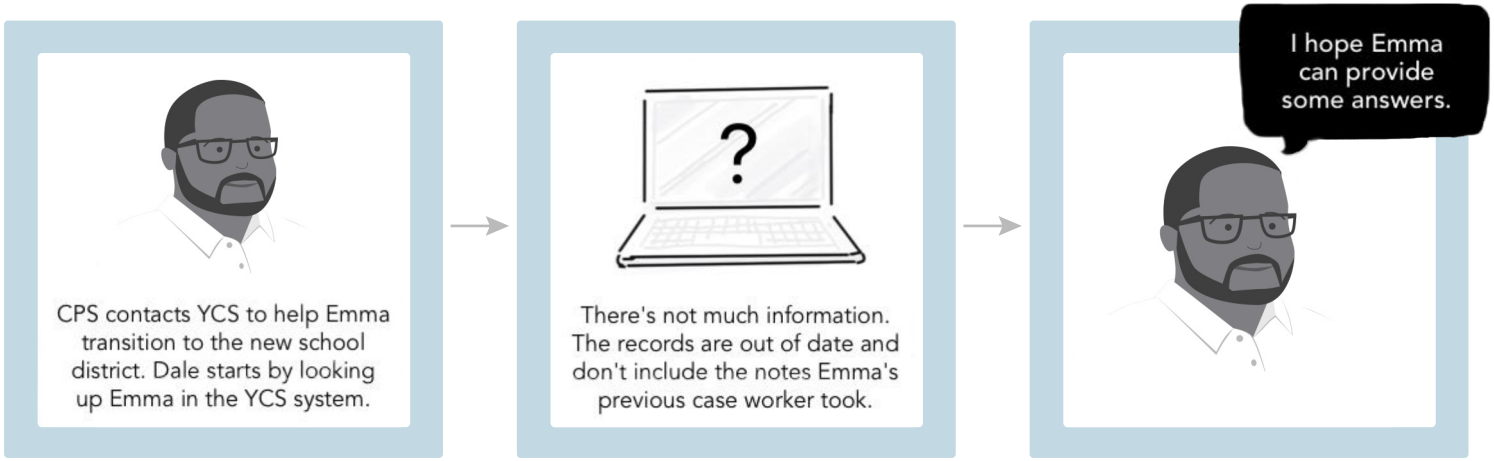
Goals

- Ensure all parties have the information they need to provide Emma with the best possible education and support.
- Comply with all local, state, and federal statutes about information sharing and data privacy.

Journey Maps

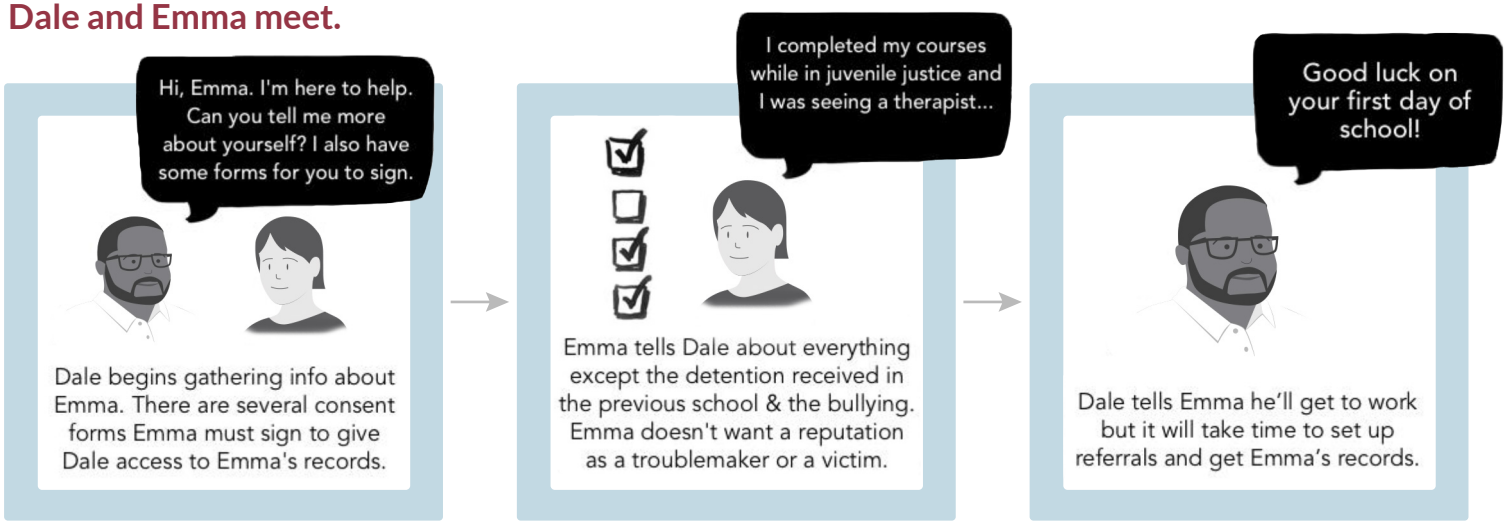
Education transitions are a complex process involving many users and organizations. Nevertheless, the key moments of an existing experience can be expressed simply and provide structure to envision solutions in the form of a journey map. This first journey map begins when Child Protect Services (CPS) contacts Dale at Youth Consultation Services (YCS) and goes through the struggles and frustrations Emma and Dale experience.

Dale takes the case.



Emotion: *Curiosity* *Frustrated* *Hopeful but skeptical*

Dale and Emma meet.

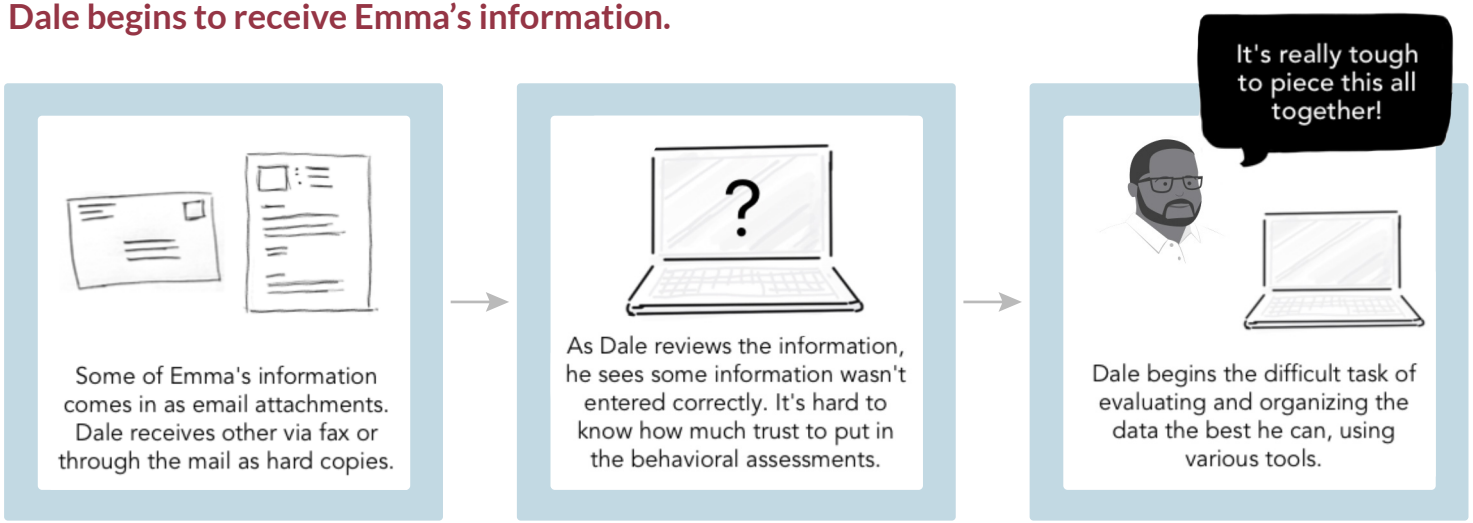


Emotion: *Nervous* *Nervous and Frustrated* *Worried*

Dale starts gathering data based on his conversation with Emma.

Emotion: *Exhausted* *Tense* *Frustrated*

Dale begins to receive Emma's information.

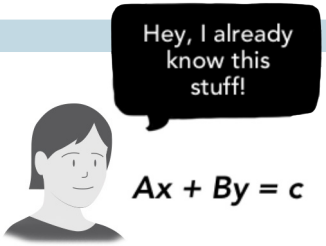


Emotion: *Concerned* *Worried* *Anxious*

In the meantime, Emma starts school.

Emma is looking forward to starting at the new school.

Emotion: *Hopeful*



But problems start to arise over the week. The school placed Emma in the wrong math class. Emma completed this course in juvenile detention.

Angry and disappointed

Bored and frustrated, Emma begins to act out. Emma's teacher isn't sure how to manage Emma's disruptive behavior. The school doesn't have the IEP and they don't know about Emma's depression or past bullying.

Emma starts to struggle.

Confused

Meanwhile, Dale still doesn't have the records from Emma's past therapist. He wishes there was more he could do to help.

Emotion: *Frustrated*

Without the records from Emma's previous therapist, Dale is unable to give Emma a recommendation. As a result, Emma is not receiving therapy to treat depression.

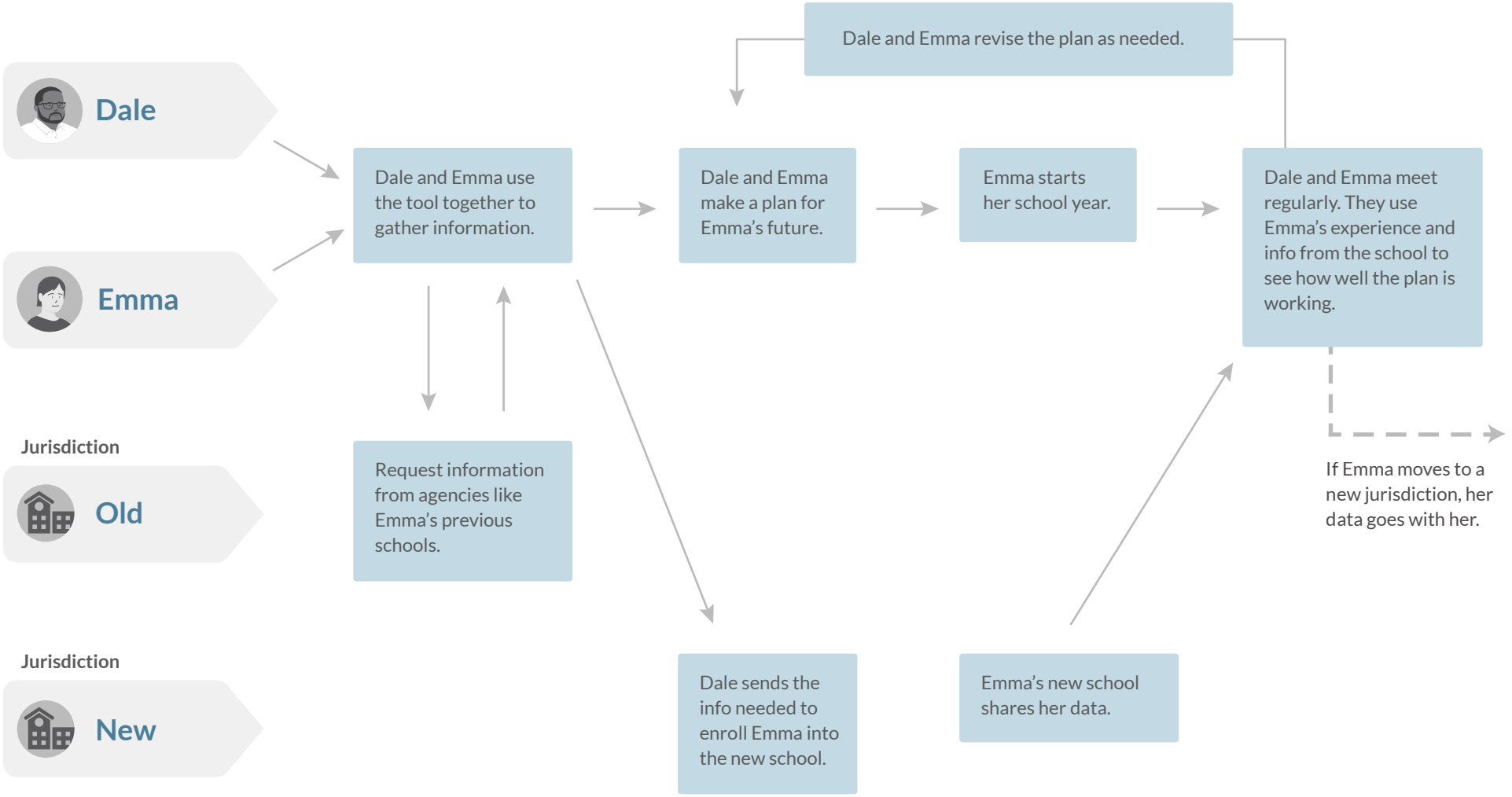
Confused

Without the therapy recommendation, Emma's depression worsens. Frustrated by the idea of repeating math, Emma is uncertain about how this school year will turn out.

Sad and frustrated

Journey Map

This map walks through an ultra-simplified journey depicting the typical current state of data and information systems for Emma and her advocate, Dale, and the jurisdictions with which they interact.

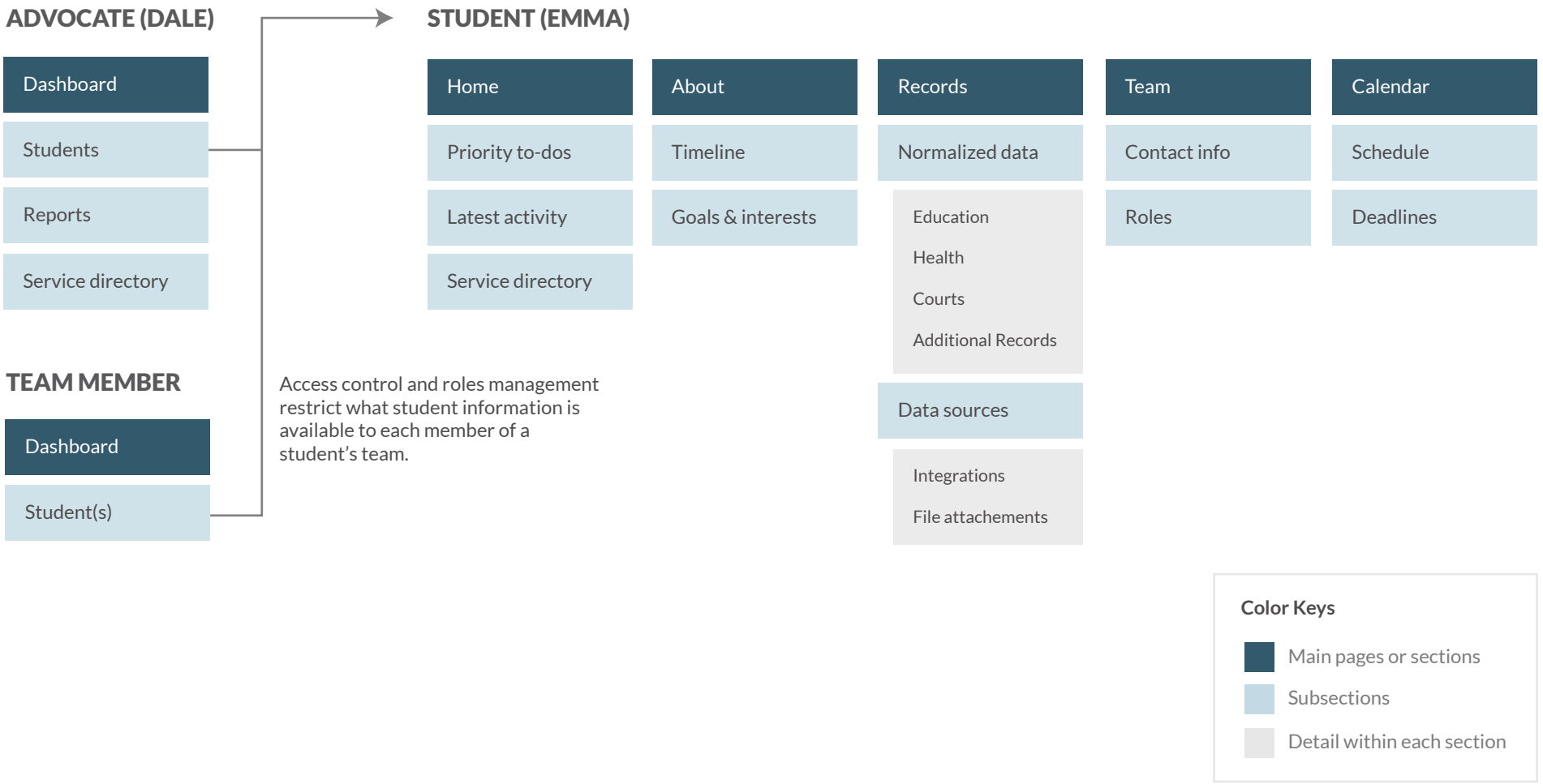


Solution Concepts

This section describes concepts for a student data tool and shows how a tool may help Dale and Emma achieve their goal of enrolling her in a new school district. We based the concepts in this section on the principles, journey, and personas presented in the Foundation section. Concepts are grouped by the goals they address. For the sake of illustration, this model student data tool is called ContinuityCounts Services.

Site Map

ContinuityCounts Services is a tool used by the student, Emma; Emma's advocate, Dale; and the other adults supporting Emma (team members). Team members include the key individuals in Emma's universe who have a legal right or obligation to see her information and make decisions based on it. The individuals who make up a team will vary, depending on Emma's circumstances and the governance structures of agencies within each state. Different team members will have different access, depending on state and local private restrictions, family consent, and other boundaries or guidelines determined locally. The Site Map provides an overview of the content each member may access.



PRINCIPLE 1

Streamline Access to Records

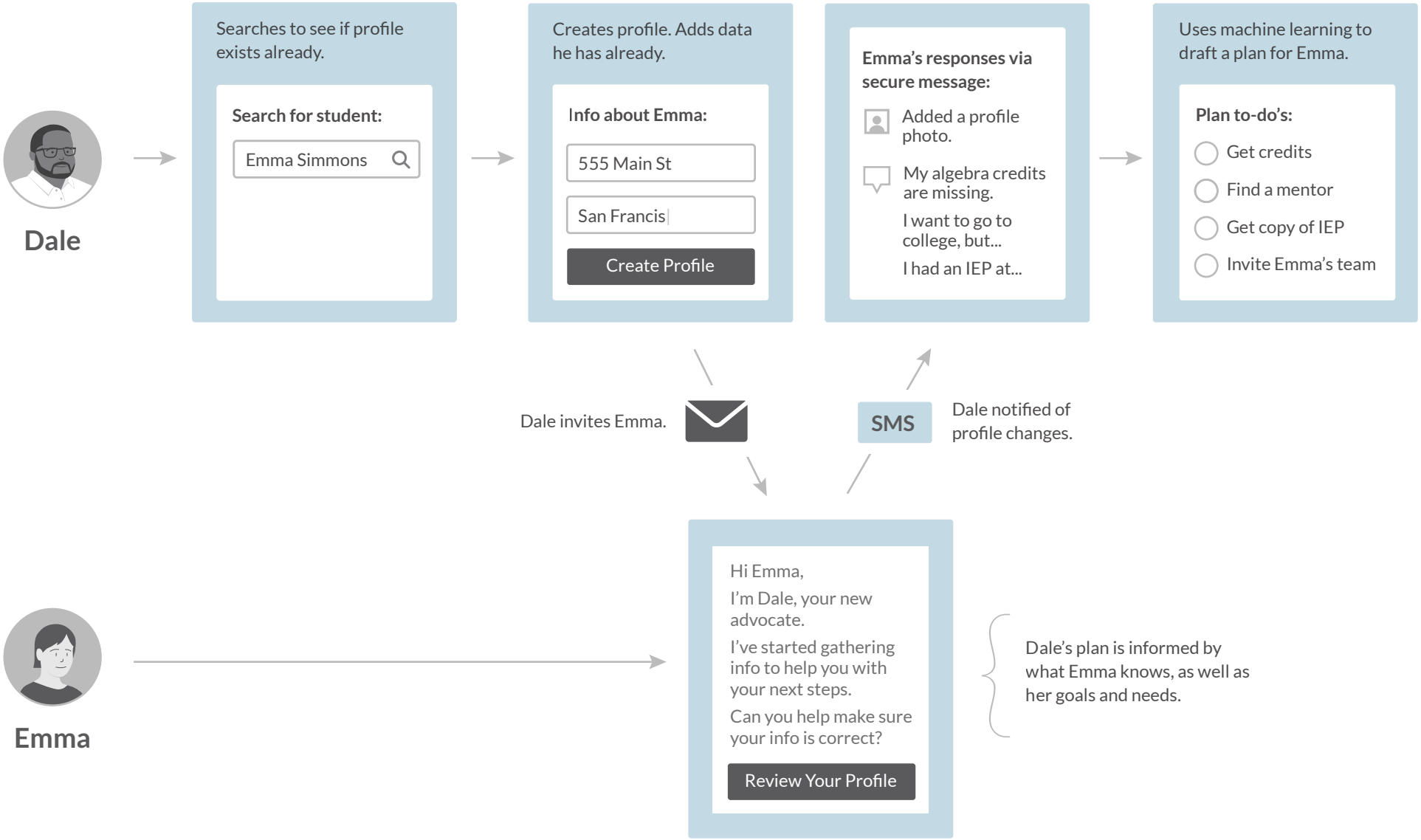
Accessing and sharing youth records requires navigating complicated privacy rules and fragmented information systems. Faster, easier access helps speed students' school enrollments and prevents cross-agency conflict.

Key Moments

- Emma receives an invite to ContinuityCounts Services.
- Dale populates Emma's profile through integrations, file uploads, and manual entry.
- Emma updates her record.

Student Invite

Emma and Dale will use ContinuityCounts Services throughout their journey. As Emma doesn't already have an account, Dale invites her to join.



Populating Student Profile

ContinuityCounts Services contains relevant data on each student's history and goals. Dale uses API integrations, file uploads, and manual entry to start populating Emma's profile. Most manual entry only has to occur once, during the initial data upload.

Application Programming Interface (API) Integrations

Third parties holding student data can push data into a profile and/or allow a profile to pull data from a third party.

Manual Entry

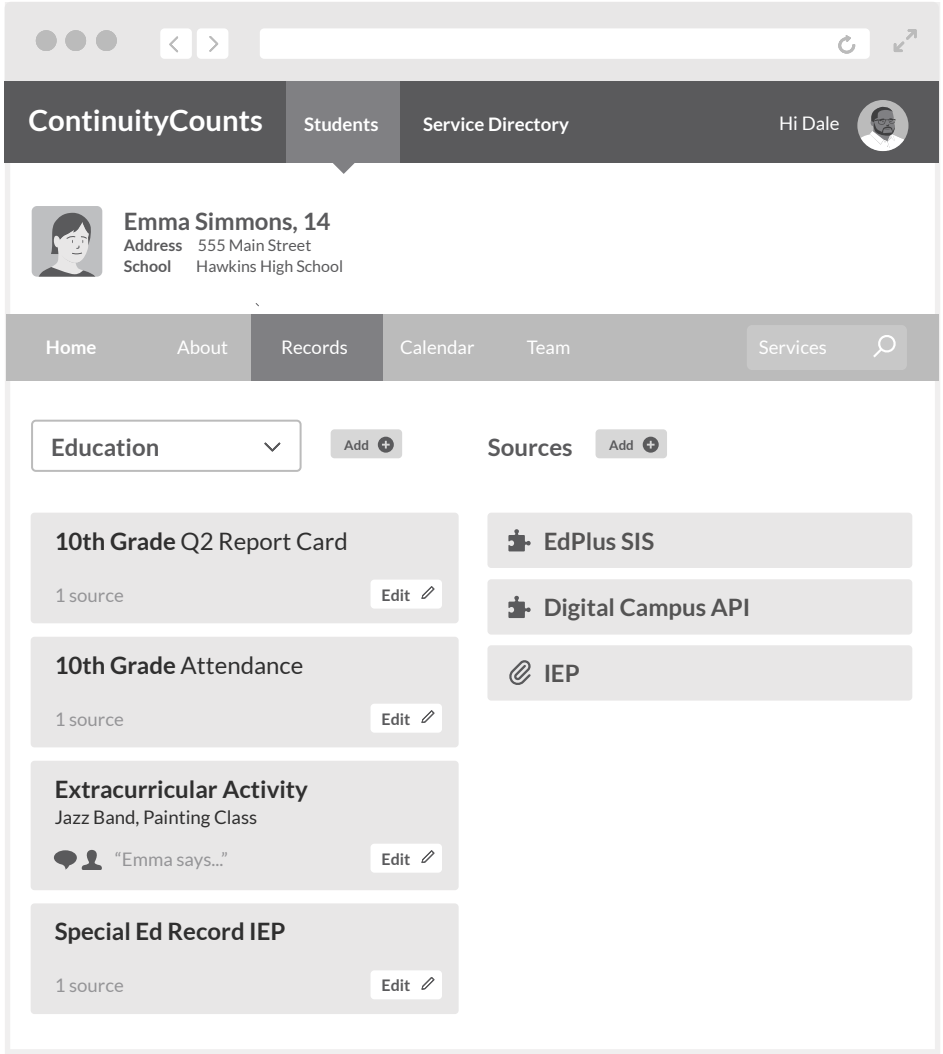
Student's team enters data into the student's profile (with appropriate permissions).

Upload Static File

The team may have printed copies or digital files containing data.

Notes

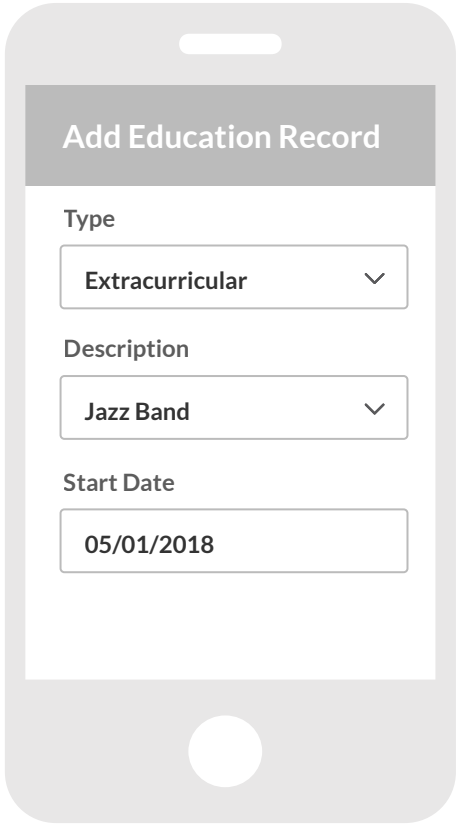
The student and team add comments to records without altering them.



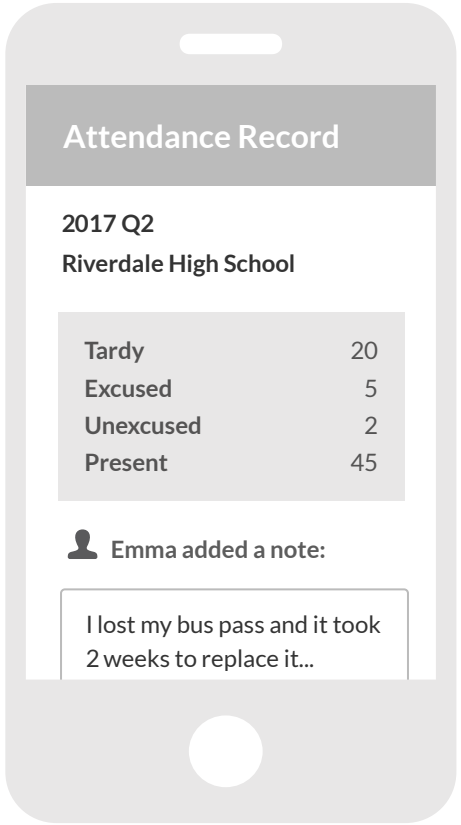
Student Contributes to Their Record

Students and trusted adults can create new records or add context to those others have added. Privacy and moderator controls can give the advocate or team the ability to review and approve contributions.

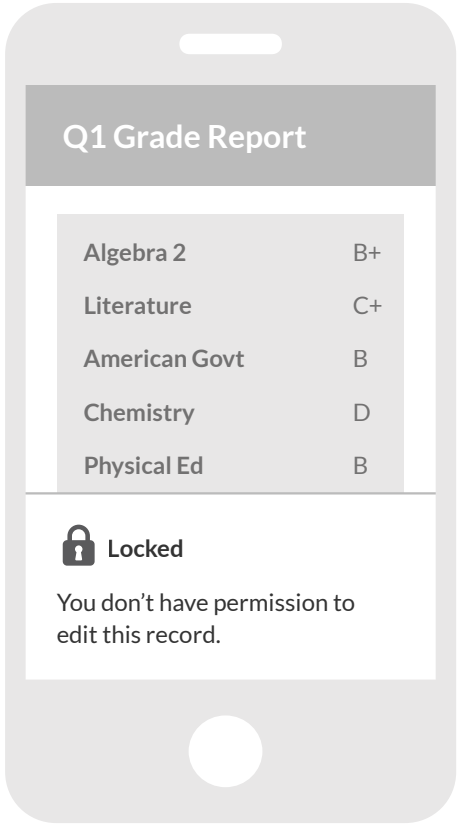
Emma, or a trusted adult, adds an extracurricular activity that wasn't in her official records.



Emma clarifies a record that may help Dale know how to help her in the future.



Access controls restrict what Emma — and others — can see, edit, or share.



PRINCIPLE 2

Guide and Streamline Support

Today, administrative burdens distract advocates from supporting students, and data systems often require manual entry or duplicated efforts. Streamlining access to and keeping track of information gives advocates more time and energy to focus on youths' goals and needs.

Key Moment

- An advocate dashboard enables Dale to view, manage, and prioritize tasks to support young people.

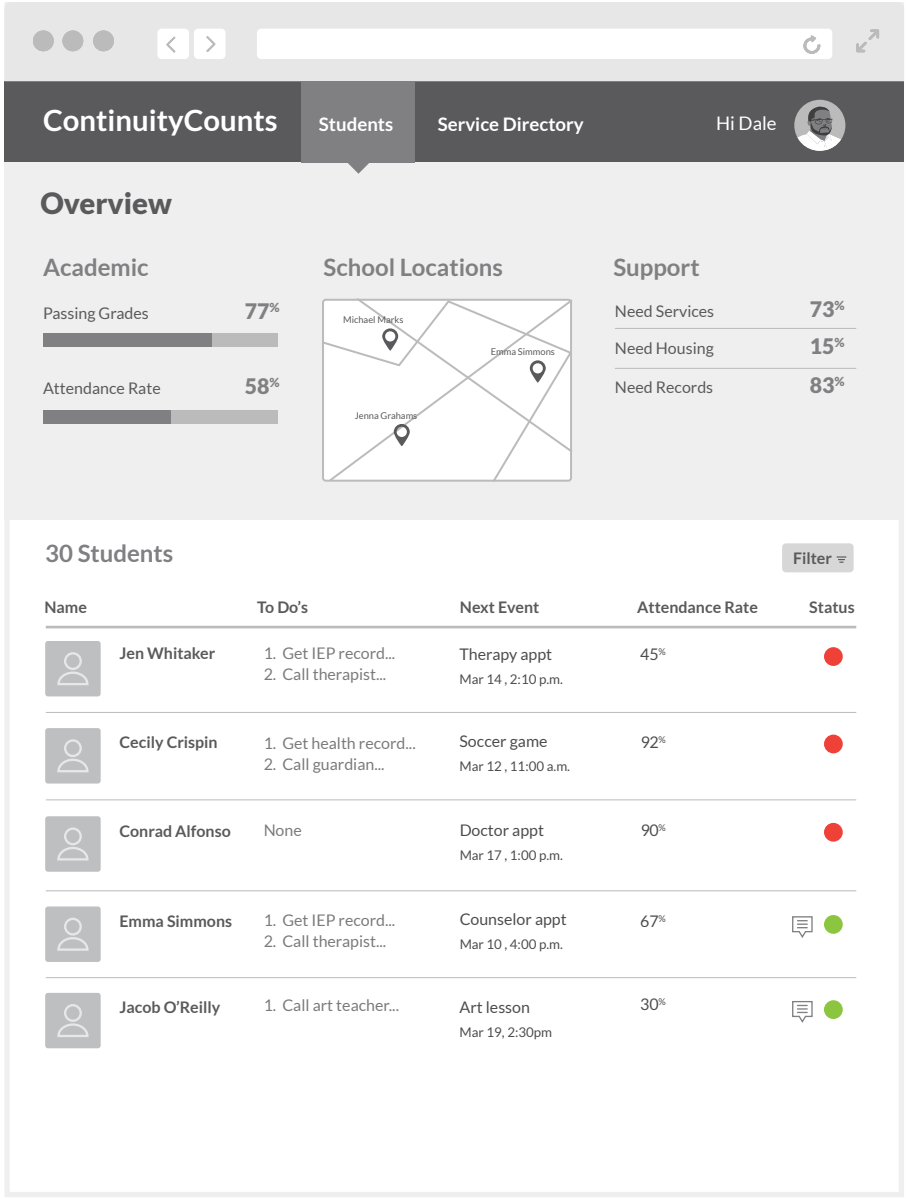
Advocate's Dashboard

The advocate's dashboard provides an overview of all of Dale's student cases. It guides Dale on where he should focus his attention.

The overview gives a snapshot of how Dale's students are doing academically and how many need support.

Each of Dale's students is listed with action items and key statistics.

Clicking on each listing shows the full student record.



A map shows where each student's school is located.

The tool intelligently highlights students that need urgent attention.

PRINCIPLE 3

Empower Students to Advocate for Themselves

Today, adults shape a young person's situation. By encouraging young people to define and share their story and advocate for their goals, we help them develop ownership of their situation and how adults support them.

Key Moments

- A youth-led profile enables Emma to shape and share her interests and goals, and develop a positive personal history.
- Emma's timeline displays important events in her history, helping her team understand her life story.

Student's Profile

The student's profile is a secure, shared resource for the student, the student's advocate, and the student's team members to organize the student's data and support their needs and goals.

Emma's needs and goals are at the center. Students or advocates could add personal touches, like a photo or bio.

Profile activity shows how student needs are addressed holistically:

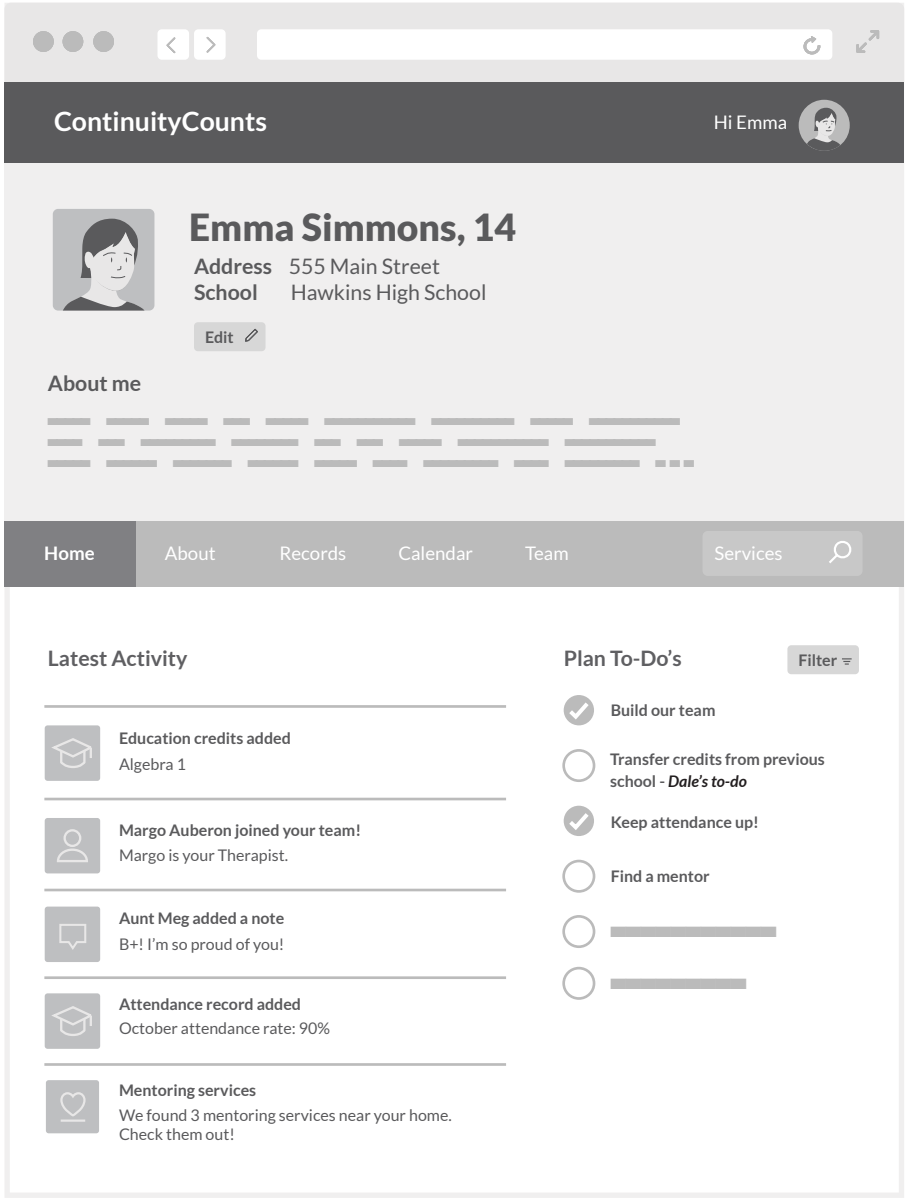
Collecting and organizing records.

Connecting the network of supports and contacts.

Including community to elevate student progress.

Accessing records allows goals to be measured.

Searching the service directory to simplify connection to needed services.

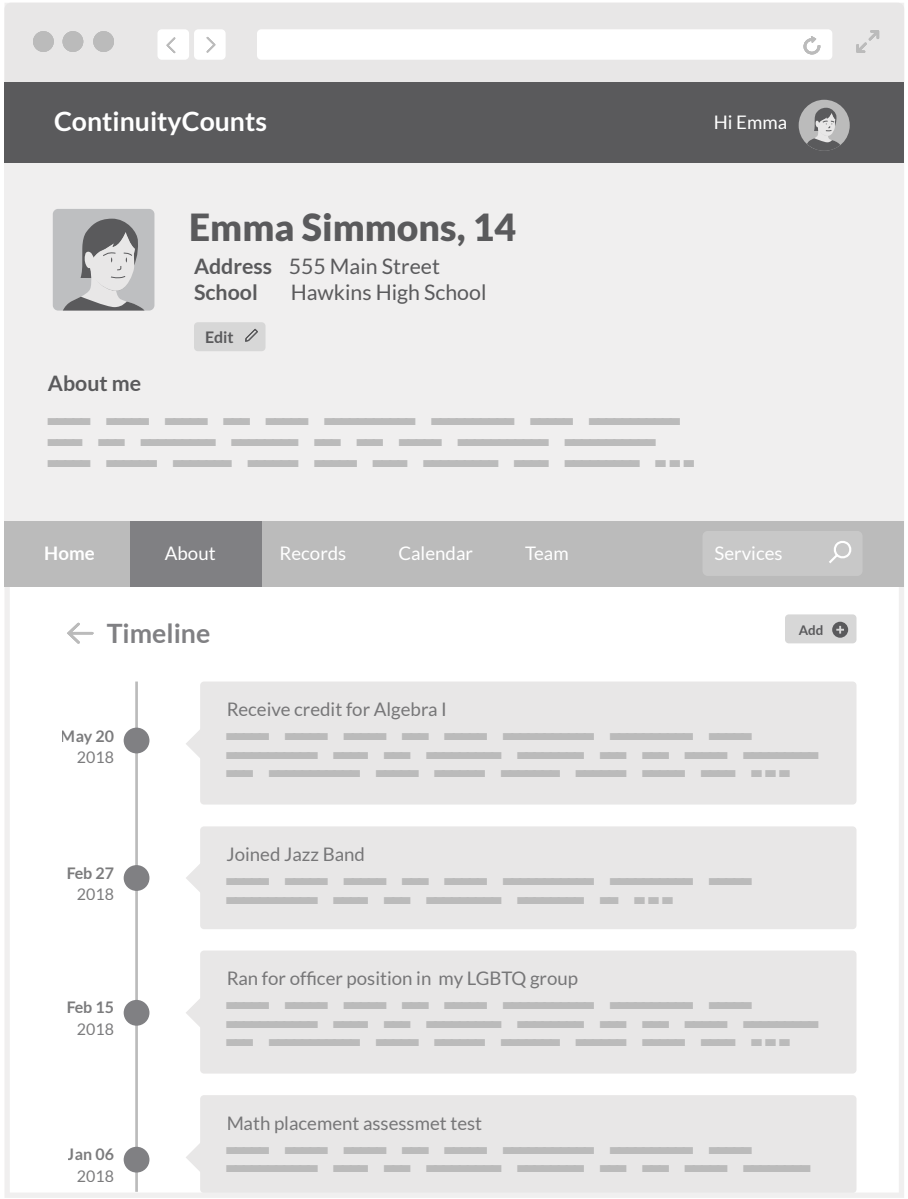


Emma and her team keep track of important goals and tasks. Each person can choose to share a to-do or keep it private.

Timeline

The student's profile is a secure, shared resource for the student, her advocate, and the support network to organize her data and support her needs and goals.

Events can be tracked in a timeline. Clicking on a timeline item shows details about it.



Emma has some control over what appears here:

This is an opportunity for her to tell her story in the way she feels comfortable.

Some events are added automatically when records are added.

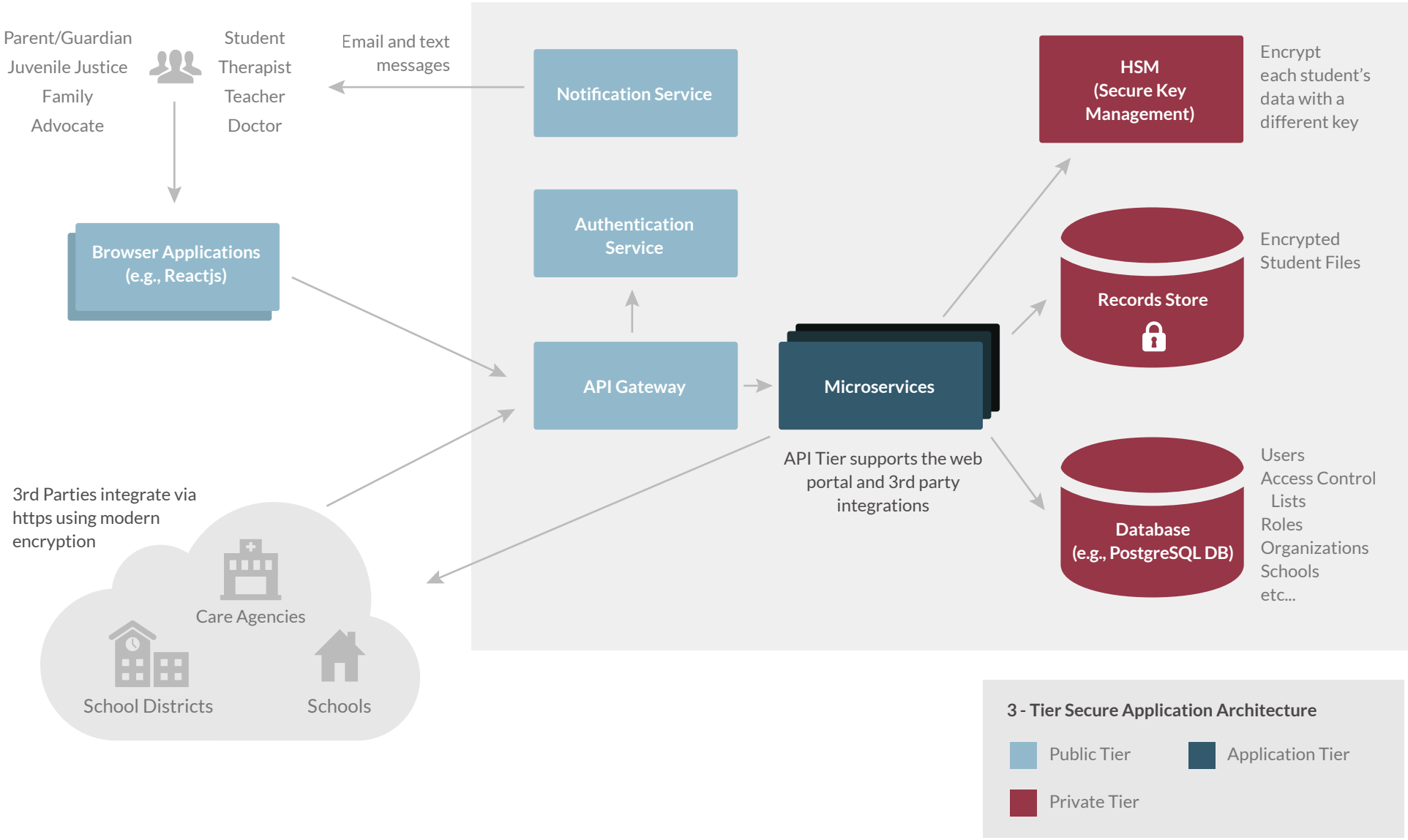
Emma can add her own significant events.

Implementation

This section is a high-level overview of the implementation architecture and considerations for designing a tool like ContinuityCounts Services.

ContinuityCounts Services System Architecture

This system architecture provides an overview of the technical elements that must be considered for a product like ContinuityCounts Services. It builds in access control and the possibility of third-party integrations from the start. Note that this is an illustration of one way to envision the system architecture; it's not the only viable way to execute a tool like this.



Architectural Considerations

The solution architecture will ultimately be defined by the delivery team. Here are some recommendations to consider.

1 Integrating with Schools and Social Service Providers

Given the number of systems currently used by various school districts, schools, and social service providers, it is easy to imagine the challenge of integrating with even half of them quickly.

When planning to implement this system, consider partnering with other organizations that have already implemented translators for different data formats/systems.

2 Compliance with Data Sharing

Since this system will manage data that must be HIPPA and FERPA compliant, it is important to build a compliant system. These systems, and their development teams, tend to have:

- Robust access control and role management features.
- Strong and modern encryption algorithms.
- Segregated duties and responsibilities between your operations and development teams.
- Well-documented and automated change-management processes.
- Pen testing and security audits performed every six months, especially during periods of active development.

3 Using Blockchain for Data Security

A blockchain is a digitized distributed ledger designed to support the decentralized sharing of data, where each data owner does not know, or does not trust, the other data owners. While there's currently public enthusiasm for blockchain, this might not be the best fit for most jurisdictions.

There are some additional considerations to keep in mind for this approach:

- Keys would need to be shared to decrypt the data or request the origin node for the decrypted data via a web service.
- Each node in the network would have to run a blockchain agent that keeps in sync with the other nodes in the system.
- There must be enough nodes in the system to provide sufficient "Proof of Work" consensus.
- Be wary of blockchain technology that is slow or that uses a lot of electricity.
- Blockchain technology may be a promising workaround for jurisdictions in which storing aggregated data is prohibited by state law.

Project Considerations

Given the potential solutions discussed in this paper, there are a host of important considerations. This final section includes prompts for discussion and recommended best practices for beginning the design process.

While technical innovation alone can only go so far, we hope the proposed solutions begin discussions around student data to ensure that youth in transition receive the services they need. The solutions presented here are not an exhaustive list but rather a starting point informed by the experiences and feedback of experts, advocates, and students from diverse backgrounds.

In the coming years, we envision that leaders will begin designing streamlined data systems and improving their existing systems. We hope these ideas will prompt organizations and individuals to reevaluate existing systems and think critically about current practices that may prevent vulnerable youth from accessing the resources they need most. We hope these recommendations allow government agencies, community organizations, and individuals to better work with one another as they keep all students, regardless of the difficult challenges and barriers youth in transition encounter, at the center of these solutions.

We focus on the following points of discussion:

1. **Understanding the Landscape**
2. **Before the Design**
3. **Building a Team**
4. **Design and Implementation**

1 Understanding the Landscape

Who is this tool for?

- Who is involved with this tool? Some examples may include students, social workers, parents/guardians, teachers/administrators, juvenile justice officers, community members, etc.
- Which users can you deliver the most value to right away?
- What goals are these users trying to achieve? What challenges do they face?
- Who are your stakeholders?
    - What is their interest in a successful design? What influence do they have on the execution of the project?
- What kind of demand exists?
- Who is potentially the customer?

What does today look like?

- Create a journey map of your target's current experiences as they try to achieve their goals.
    - Who do they interact with? What actions must they take?
- Create a map of where data is currently stored today.
    - Is there any overlap? Can any of this data be linked or consolidated into a central system?

Create a one-page outline of your successful design's goals

- Clarify who the primary customer is, what their core problems and goals are, and why your sponsor/jurisdiction believes the effort is a worthy investment.
- List the primary objectives in a bulleted list. How will you know when an objective is complete?
    - What metric will you use to measure this?
- Be clear about what's not in scope. You only have so much time and money. What features or services are off the table for now?

How will you measure this project's success?

- What are the measurable improvements the project will have on your organization and end users?
- What will you do if it is not successful?

2 Before the Design

Is aggregating personally identifiable student data into a centralized tool legal in your jurisdiction?

Who has the authority to make and enforce changes to data-sharing processes in your jurisdiction?

Who are the stakeholders for this successful design?

- Do you have buy-in from:
    - stakeholders within your organization?
    - stakeholders in the agencies involved in this project?
    - the people who will use this product?

Who can help you champion and socialize this work? How much cooperation do you have between agencies within your jurisdiction?

What does a shared student-centered vision and goals for the pilot look like for all participating agencies?

What data can be shared under current local, state, and federal privacy laws?

- Do all your partners understand these laws?

What resources are available to you?

- Time, money, staff?

3 Building a Team

To create a successful design, create a multidisciplinary team.

- A product owner aligns and prioritizes your organization and end-user needs, and ensures you're delivering the most value for the given constraints. A product owner works with stakeholders to keep the team's effort and measures of success aligned with the organization's objectives.
- Designers partner with product developers to make sense of user needs and creatively explore, validate, and refine solutions to help users meet their goals most efficiently.
- Those familiar with the existing software systems used by school districts and jurisdictions can provide necessary background information.
- Assemble a development team with these capabilities:
  - Experience with building and architecting systems that handle highly sensitive data. You must build a system that is minimally resilient against the latest "OWASP 10" list.
  - Ability to implement a secure software development process that includes automated security scanning.
  - Cross-functionally strong, covering front-end, back-end, and development skills.

Consider working with security and compliance specialists.

- These people may be a part of the core team or they may be consultants you review work with regularly.
- Legal/policy support.
- Pen testing and architectural audit. You will want to have your system "pen tested" before going live.

Convene a "customer council."

- A customer council is a group of end users you can check in with on a regular basis. This could include students, social workers, parents/guardians, teachers/administrators, etc.
- The council facilitates user research and validates the team's ideas.
- Frequent check-ins create a culture of transparency and inclusion in the design's development.

Consider who will fund and sustain the system.

- Will the state educational agency agree to pay the full long-term cost, including maintenance and technology evolution?

4 Design and Implementation

Create a map of the user's experience with the design in place.

- How will your intervention improve the user experience?
- What are the key moments?

Create artifacts to test.

- These could be low-fidelity wireframes of the key moments or a high-fidelity clickable prototype.
- Review your ideas with users to validate whether your intervention helps them meet their goals.
- Test demand with a website and a mock-up of the system that includes a sign-up page.
- Revise your designs.

Create a backlog of user stories.

- User stories describe a software feature from an end-user perspective. The user story describes the type of user, what they want, and why. A user story helps create a simplified description of a requirement and communicates the solution to the development team.
- A backlog is a prioritized list of things you may build as part of the design. Not everything has to be built right away.

Build and test.

- Bugs prevent users from fully using the application and providing their most valuable feedback. It's important to test each feature to ensure that the work is complete before moving along to build the next feature.
- Use both automated and manual testing.
- Frequently test with a variety of users to ensure that you build a product people want to use.

Consider the market for the product.

- What are the current solutions?
- Who are your competitors?
- What is your advantage?

Consider the adoption plan.

- What non-tech support is necessary?
- What is the upfront and ongoing training?
- How do new case workers learn the system?

Iterate and plan next steps.

- Engage with your users often.
  - Is the design helping them achieve their goals in the ways you expected?
  - How could the design improve?
- Create a plan for expanding the design.
- What users should you include next?
- What additional data sources could you integrate?

Glossary

API integrations — application program interfaces (API) are tools that make it possible to manage software applications.

FERPA – the Family Education Rights and Privacy Act protects the privacy of student education records.

HIPAA – the Health Insurance Portability and Accountability Act protects the privacy of individual medical records.

Machine learning — application of data analysis that allows systems to identify patterns to make decisions with minimal human interaction.

OWASP 10 — the Open Web Application Security Project Top 10 most critical application security risks.

Pen testing — the testing of a computer system, network, or web application to find security vulnerabilities that an attacker can exploit.

PostgreSQL DB — an open-source database.

Reactjs — a JavaScript library for building user interfaces.

Statewide Longitudinal Data System (SLDS) — combines data from across a state to answer critical questions about education and workforce policy.

Student Information System (SIS) — a management information system for education providers to manage student data.

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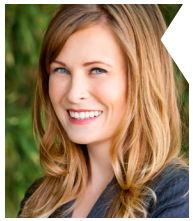

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About Bellwether Education Partners

Bellwether Education Partners is a national nonprofit focused on dramatically changing education and life outcomes for underserved children. We do this by helping education organizations accelerate their impact and by working to improve policy and practice.

Bellwether envisions a world in which race, ethnicity, and income no longer predict opportunities for students, and the American education system affords all individuals the ability to determine their own path and lead a productive and fulfilling life.