SHOW ME
DIGITAL TALENT FARM

We grow IT, Missouri reaps the harvest

Supplemental Detailed Research

Contents

Executive Summary

We will partner with the Department of Higher Education and Workforce Development to create a nationally accredited apprenticeship program, **Show Me Digital Talent Farm**. We will recruit individuals that have the desire to be programmers but do not yet have the experience or education to qualify for our entry level positions. We will assess the aptitude of candidates and this will be the key entrance criteria for an apprenticeship. Candidates will be selected from the qualified list based on their aptitude and an interview process tailored to **Show Me Digital Talent Farm**.

We will create a core curriculum that will include training paths in Pluralsight, MO Learning, and internally developed workshops. Each starting **Show Me Digital Talent Farm** cohort will be put in a path for the area that has the highest need (e.g. .NET programming, API development, Java development, Website development, etc.)

As modules of the core training curriculum are completed, Apprentices will be assigned key project work that reinforces and enhances what they learned in the core training. As part of the core training, assessments will be required to be taken along the way. The assessments will gauge where the Apprentice has strengths and weaknesses on his/her learning path. Based on that assessment, recommendations are made for key learning objectives to provide an adaptive learning environment. We will match the Apprentices with projects that meet them where they are in their training. Initial project work will be very targeted assignments to learn specific skillsets augmenting their training to date.

At the end of the apprenticeship, a final assessment will determine the Apprentices' "Job Readiness". If successful, the Apprentice will become a full-time developer in a position level that matches the final assessment.

Advisory Resources

In addition to our Show Me Challenge team members, we engaged with experts in various State Agencies and Departments during our research:

1. **Mindy Allen**, Personnel Analyst, Office of Administration, Division of Personnel
2. **Corey Bolton**, Deputy Director, Office of Administration, Office of Equal Opportunity
3. **Elaine Bryan**, State Director, Adult Education and Literacy, Missouri Department of Elementary & Secondary Education
4. **Tammy Cavender**, Deputy Director, Missouri Department of Labor and Industrial Relations
5. **Cindy Dixon**, Director, Office of Administration, General Services and OA Operational Excellence Leader

What is our Problem?

We cannot deliver the value our state demands for applications because we cannot fill vacant IT Developer positions with skilled candidates.

Root cause:

Low applicant pool for high demand

In FY18, the number of applicant respondents to ITSD's Application Developer Information Technologist I-IV job postings declined drastically and has continued to drop since that time:

Respondents to ITSD's Application Developer Information Technologist I-IV

FY16	FY17	FY18	FY19	FY20 Projection
191	248	165	133	91
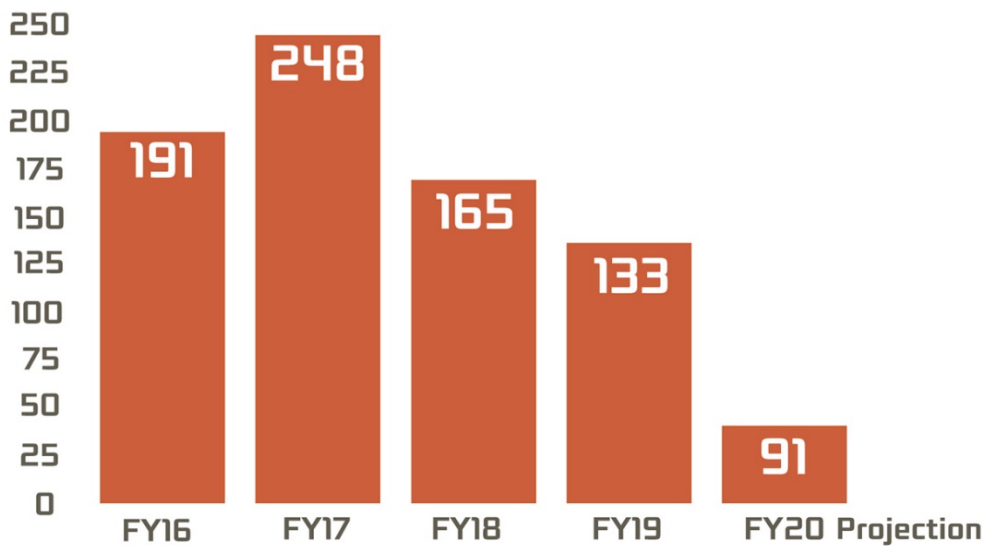
Additionally, the skill sets and job-readiness of those applicants applying did not match identified qualifications. Many applicants have no formal education, no IT education, and no relevant work experience. This has had a severe impact on the State's ability to fill IT related vacancies. As a result, many vacancies go unfilled from month to month due to lack of qualified candidates. In FY18 alone a staggering 64% of ITSD Application Developer Information Technologist I-IV vacancies went unfilled two or more months.

64% of Application Developer Information Technologist I-IV vacancies went **UNFILLED FOR 2 OR MORE MONTHS**

Number of Positions Unfilled

Below identifies the number of group posting positions that were left unfilled:

Quarter/Year	# of Postings	# of Candidates	# of Candidates Hired	# of Positions Carried Over
January - 17	4	25	1	3
February - 17	5	22	3	2
March - 17	9	21	2	4
April - 17	10	26	5	4
May – 17	8	29	4	2
June – 17	6	29	3	1
July – 17	5	18	1	2
August - 17	4	27	2	2
September – 17	6	18	4	3
October – 17	3	19	0	2
November – 17	5	26	1	4
December – 17	1	9	1	0
January – 18	9	17	2	4
February - 18	9	18	3	1
March - 18	5	18	2	5
April - 18	7	13	2	3
May – 18	7	25	3	4
July – 18	5	14	0	5
August – 18	14	22	4	11

Total # of Postings:
122

Total # of Positions Filled:
44

Total # of Positions Unfilled:
78

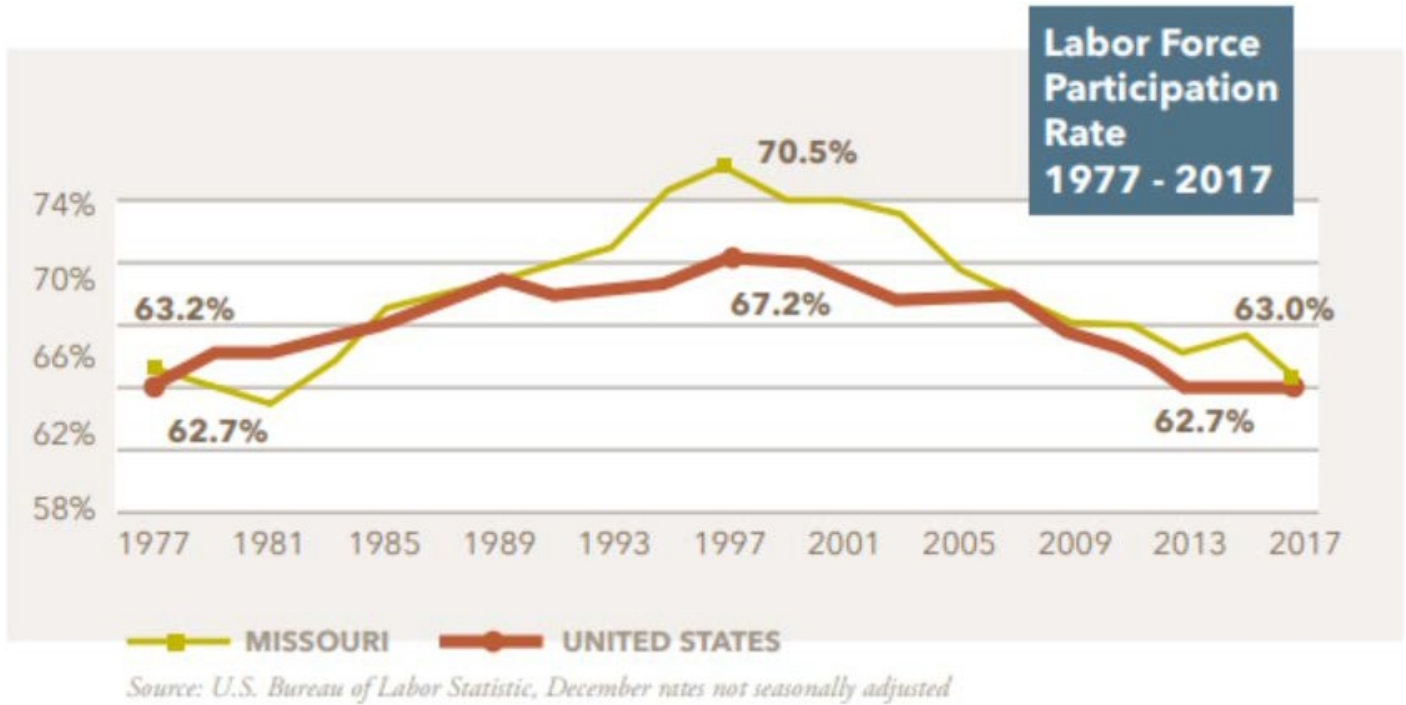Average Percent of Vacancies Unfilled:
64%

ITSD research

According to the June 2018 report by KCUR 89.3, Kansas City's public radio station, **Missouri Employers Struggle to Find Qualified Workers** the skill gap is not the only problem. The U.S. workforce is also on the edge of a demographic crisis.

Missouri has 1.6 million people between the ages of 44 and 65 who are expected to retire in next 20 years, according to the Missouri Chamber of Commerce report. However, only 1.4 million Missourians under 18 are expected to fill positions left open when the older workers retire, creating a shortage of 200,000 workers.

Not only is there a shortage of qualified IT workers in Mid-Missouri, but the State of Missouri is competing with companies across all sectors for talent, according to the July 2018 report *As Missouri's economy heads further into the 21st century, companies of all sectors may a face crisis in the coming years* published in the Jefferson City News Tribune and subsequently in the #jcmo Inside Business journal. In that article, Shaun Sappenfield, existing business manager at the Jefferson City Area Chamber of Commerce, said companies around the region have struggled to find tech workers for "quite some time."

A **May report from the Missouri Chamber of Commerce**, called Workforce 2030, concludes there are not enough workers for jobs requiring more than a high school diploma but less than a four-year degree. While 53% of Missouri jobs fall into this category, only 46% of workers meet those criteria, according to the report.

Show Me Digital Talent Farm

- Shrinking Workforce Participation – page 8

Labor Force Participation Rate 1977 - 2017

Source: U.S. Bureau of Labor Statistic, December rates not seasonally adjusted
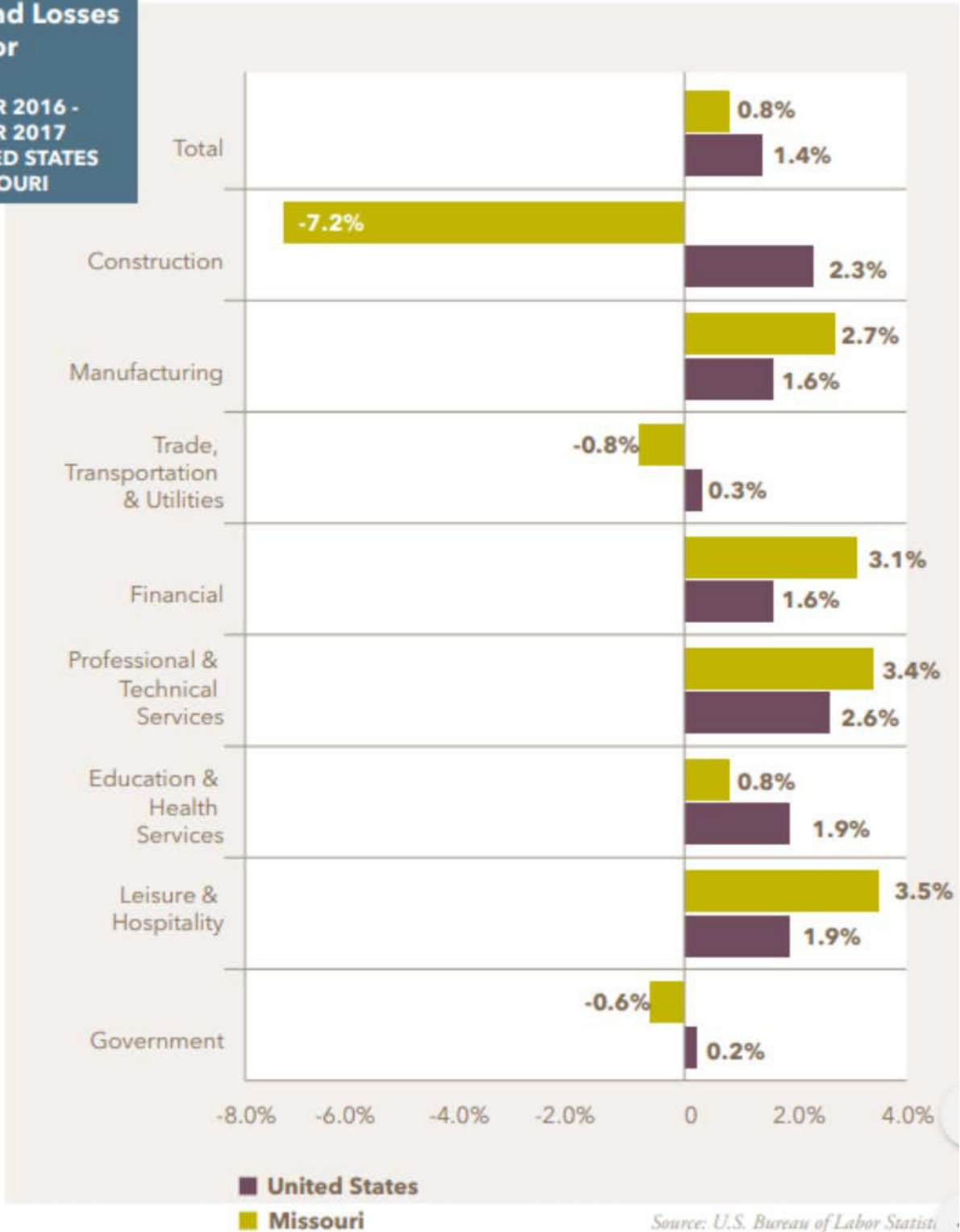
For Missouri to positively impact labor force participation, it will need to implement strategies to connect more individuals in these groups with training, skills improvement, and work opportunities, such as **Show Me Digital Talent Farm**. As projected the number of Information Technology online job postings continued to grow in the past 12 months.

SOC Code	Occupation	Job Postings
**Online Job Postings in Missouri**
**Nov. 01, 2018 - Oct. 31, 2019**
15-1132	Software Developers, Applications	14,409
15-1199	Computer Occupations, All Other	14,107
15-1151	Computer User Support Specialists	4,573
15-1121	Computer Systems Analysts	3,607
15-1134	Web Developers	2,228
15-1122	Information Security Analysts	2,095
15-1141	Database Administrators	2,095
15-1142	Network and Computer Systems Administrators	2,026
15-2031	Operations Research Analysts	1,458
15-1143	Computer Network Architects	1,344
15-1131	Computer Programmers	1,038
15-1111	Computer and Information Research Scientists	638
15-2041	Statisticians	383
15-1152	Computer Network Support Specialists	371
15-2011	Actuaries	212
15-1133	Software Developers, Systems Software	160
15-2021	Mathematicians	4

Source: Labor Insight Jobs (Burning Glass Technologies)

Show Me Digital Talent Farm

- **Workforce 2030**, Changing Job Landscape – page 16

Employment Gains and Losses by Sector

DECEMBER 2016 - DECEMBER 2017 FOR UNITED STATES AND MISSOURI

Sector	United States	Missouri
Total	1.4%	0.8%
Construction	2.3%	-7.2%
Manufacturing	1.6%	2.7%
Trade, Transportation & Utilities	0.3%	-0.8%
Financial	1.6%	3.1%
Professional & Technical Services	2.6%	3.4%
Education & Health Services	1.9%	0.8%
Leisure & Hospitality	1.9%	3.5%
Government	0.2%	-0.6%

Source: U.S. Bureau of Labor Statistics

Missouri is also growing jobs for the future. Missouri had significant growth in many of the advanced industries identified by the Brookings Institution as components of an emerging, knowledge-based sector. These include computer systems design, architectural, engineering and aerospace.

Show Me Digital Talent Farm

Citizen Employment Not Matched to Ability

Untapped talent exists. Often, we encounter someone who we believe has the aptitude to excel as a team member but lacks formal education or work experience to match our Uniform Classification & Pay job qualifications. We have all heard stories of individuals who are "self- taught" and who could prove to be a contributing team member if given the chance.

- Our IT Project Teams encounter prospective team members from our existing State Workforce when collaborating on project teams. State Employees with years of service and tenure, vested in state employment already, having performed complex work in their current roles. If given an opportunity to grow and learn they have potential to thrive as an application developer.

- State of Missouri citizen services work with individuals within non-IT careers every day who could have the potential to excel as an application developer.

  - Displaced workers from employer shut-downs
  - Graduates from Adult Education & Literacy programs
  - Driven individuals who suffer workplace injury and are unable to return to their previous line of work

High Turnover

ITSD has been plagued with high turnover rates for the past 5 years. Statistics provided by OA Division of Personnel for a one year period – November 2018 to October 2019 - show **higher turnover rates for entry level positions, nearly doubling 2018's overall ITSD-wide turnover rate** of 11.89%:

Turnover Rate
11/1/2018 - 10/31/2019

Information Technologist I:
21.9%

Information Technologist II:
24.4%

ITSD-wide data provided by OA Human Resources for ITSD job titles **ranging from Entry Level to Supervisor*** show an increase in turnover from Calendar Year (CY) 15 at 11.10%, to CY18 at 11.89%.

* Information Technologist I-IV, IT Specialist I/II, and IT Supervisor

Turnover Rate
Calendar Year 2015-2018

ITSD Turnover:
Based on an average for an Information Technologist I-IV, Specialist I-II, and IT Supervisor for calendar year 2018 to-date is:
11.89%

State Turnover:
Total state turnover for the calendar year 2018 to-date is:
20.7%

There are several contributing factors to turnover and significant measures are being taken at the Executive level to address ITSD's turnover. However, it is our belief that **Show Me Digital Talent Farm** will contribute greatly to a reduction in turnover rates as a result of these specific areas of impact on Apprentices – salary, training, job satisfaction, and mentorship, just to name a few.

- **Salary** – A candidate who joins **Show Me Digital Talent Farm** with an attractive salary and greater earnings potential who otherwise would be limited in their current earnings potential, would have more job satisfaction and reward, resulting in a sense of loyalty to the State. They would not have student loan debt like that of traditionally educated IT resources who often leave State employment for greater salaries. Being able to provide a living wage for yourself and your family instills pride, builds self-esteem, and reduces reliance on other state and federal assistance programs. With **Show Me Digital Talent Farm** this demographic would have a pathway to improve their circumstances – not only to survive but to THRIVE.

- **Training** – Introducing a standardized training curriculum for **Show Me Digital Talent Farm** coupled with on the job training assignments will allow Apprentices to receive superior and very relevant training that otherwise may not be available to them without great personal and financial expense. The training curriculum developed for **Show Me Digital Talent Farm** can be used across Application Development shops statewide to ensure all new hires receive the same technical training to support their agility in work assignments. Having a clearly defined training program and pathway to professional development is what all employees want and when little or no career path is obvious, staff often begin to seek other employment opportunities.

- **Job Satisfaction** – As a member of **Show Me Digital Talent Farm** Apprentices will have opportunities to immediately take what is learned and apply it to meaningful work. This makes work fun and provides self-satisfaction and a true sense of accomplishment. Employees develop a strong sense of belonging and loyalty to the employer for the opportunity.

- **Mentoring** – By nature of **Show Me Digital Talent Farm** and the candidate makeup, each Apprentice will be getting a "leg-up". A chance to grow professionally, be mentored by the **Show Me Digital Talent Farm** leaders, and be immersed in varying work projects, Apprentices will help to mentor each other, building a strong camaraderie of staff that will continue to work well together as they advance out of the apprenticeship into journeyman positions with different application developer teams across ITSD.

These factors align with those identified by the US Department of Labor in their publication, **Apprenticeship Toolkit**.

- Businesses that use apprenticeships reduce worker turnover by fostering greater employee loyalty, increasing productivity, and improving the bottom line.

- Apprenticeships offer workers a way to start new careers with good wages.

- Workforce organizations, community colleges, and other education and training institutions can use apprenticeships as a proven employment and training strategy.

What are others doing?

Our research indicates that tech companies, in both private and public sectors, are turning to apprenticeship programs in order to grow and sustain a highly skilled IT workforce.

LaunchCode based in St Louis, MO, is building a skilled workforce by creating pathways for driven people seeking careers in technology. They help jobseekers - new tech talent from all backgrounds and walks of life - enter the tech field by providing accessible education, training and paid apprenticeship job placement.

Catalyte, a workforce data science company with development centers in Baltimore, Boston, Chicago, Denver and Portland, OR, has created a diverse, US-based technology workforce to help companies close the talent gap and scale software innovation. Their 5-month training program for qualified individuals has been highly successful and is strategically marketed with this simple statement: **"No experience? No problem. Catalyte offers a training program to become a software developer."**

In June 2017, **IBM** announced its intent to expand partnerships with numerous community colleges in the United States to better prepare more Americans for "New Collar" career opportunities. IBM's Columbia, MO location is working with Moberly Area Community College (MACC) in Moberly, MO, State of Missouri Adult Education & Literacy (AEL) and Workforce Innovation and Opportunity Act (WIOA) service providers and workforce development partners, to design an apprenticeship program to address the need for IT Talent in the Columbia Missouri region. The first class of New Collar interns, many of whom attended MACC, started with IBM in the spring of 2017.

State of California Government Operations Agency (GovOps) just announced November 15, 2019 their new apprenticeship pilot: "New apprenticeships offer fast-track to California IT jobs". Sharmayne Long, Consultant, CalHR Statewide Workforce Planning, CalHR Workforce Development Division, provided these details: "CA Government Operations Agency (GovOps) oversees a few apprenticeship pilot programs – one being an IT apprenticeship program focused on Networks. They currently do not address the application developer role."

Their program website states "The Information Technology Apprenticeship program is the first public sector program of its kind in the nation, and the initial cohort became the first to focus on networking."

"Now on its third cohort focusing on service desk training, the Pilot has successfully run two cohorts focusing on networking training. For up to two years, apprentices work in an IT unit, earn college credits through Sacramento City College and take an exam to become Cisco Certified Entry Networking Technician certified."

What does Gartner Recommend?

Gartner, a global research and advisory firm providing information, advice, and tools for leaders in IT, finance, HR, customer service and support, communications, legal and compliance, marketing, sales, and supply chain functions, recognizes that Government CIO's have a shortage of the digital talent necessary for a digital transformation and to establish a digital government. The workforce must be retooled to deliver modern IT platforms. The nature of government exacerbates this further:

- Aging workforce
- Lack of competitive pay
- Limited and time-consuming hiring processes

Government CIO's must be creative to solve these issues. An apprenticeship program focused on developing the needed talent is a way to reskill current employees that have highly valuable institutional knowledge but outdated skills.

Gartner recommends four key foundational components to an apprenticeship:

• Skills and competencies: Target skills that are needed to move forward, not current or old skills.

• Value-added work: Give the apprentices actual work that will meet the organizational objectives and partner them with team members to mentor them. On-the-job training is a key learning tool.

• Accompanying study: Because career changes require different educational underpinnings, accompanying study must be part of the program. Otherwise, it is simply on-the-job training. This study can come in different forms. Various government agencies provide multiple programs that may be able to support formal education.

• One-to-many relationships: The complexity of skills required for digital government necessitate that the apprentice has access to multiple individuals in order to truly gain the breadth of learning required to be successful. While apprentices will establish relationships through the value-added work, they should also have access to individuals who can teach them other aspects of the mission/agency, expose them to different careers and provide differing perspectives that expand thinking.

What will we do?

Develop and Launch a Registered Apprenticeship

We will partner with Missouri's Department of Higher Education and Workforce Development (DHEWD) to develop a "Registered Apprenticeship" program, **Show Me Digital Talent Farm,** that addresses **Five Core Components:** Employer Involvement, Structured On-The-Job Learning, Related Instruction, Rewards for Skill Gains, and National Occupational Credential. Recommendations in the US Department of Labor publication **Quickstart Toolkit for Building Registered Apprenticeship Programs** will be observed as we develop the **Show Me Digital Talent Farm**, ensuring national recognition and certifications for successful Apprentices.

Our approach is to fully define the **Show Me Digital Talent Farm** framework that can be utilized across State of Missouri Agencies with little adaptation required, except for the apprenticeship role and training design, which we refer to as the model. Our proposal is to fully develop **Show Me Digital Talent Farm** framework and a specific model for an **Application Developer** role.

Recruit Candidates

When **Show Me Digital Talent Farm** is launched, we will utilize several recruitment approaches.

• Advertising/marketing targeting current State of MO Workforce
• Apprenticeship Awareness & Informational Meetings
• LinkedIn
• Outreach to State of Missouri citizen services who work with displaced workers, Adult Education & Literacy programs, Injured Workers, Veterans Services, etc.

The popularity of tech boot camp educational programs supports there is a significant number of Missouri citizens desiring to learn Tech Skills. As reported in **The Best St Louis Coding Bootcamps**, enrollment and tuition fees paid out of pocket, or via a student loan program, range from free (employer funded), to upwards of $25,000 for up to 6 months of training. **Show Me Digital Talent Farm** will train the apprentices on the job eliminating the need for them to suffer financial hardships to pay enrollment and tuition fees and other adversities that result when someone with a family and other related commitments returns to school in evening classes while attempting to maintain gainful employment. It is our belief that we will have ample candidates interested in the **Show Me Digital Talent Farm** opportunity.

Assess Candidates

We will utilize standardized assessments that gauge a candidate's ability to think logically, understand complex relationships, quickly comprehend written material, work independently, focus on details and utilize emotional intelligence among other attributes. Assessments like these are commonly used by companies who offer apprenticeship programs, and by many of the identified top ten **"Best St Louis Coding Bootcamps",** such as Claim Academy and LaunchCode.

One company identified during our research is Walden Testing. Over 40 years ago, **Walden Testing** pioneered aptitude tests for programmers, Information Technology, and related fields. An information packet and pricing request was submitted to Walden Testing for potential consideration.

We also launched a review of assessments offered through the State of Missouri's new Applicant Tracking System, HireTrue. Our current contract includes use of a basic soft skills assessment with an option for HireTrue to develop a skill assessment targeted to specific roles. The review consisted of approximately 40 invitees of current ITSD Staff to take the basic assessment offered by HireTrue – 35 assessments were taken and at the time of this submission, we await the full report of the exercise from HireTrue. Where possible we will utilize MO Learning training tools, progress reports and skill assessments to further assess candidates for acceptance into the apprenticeship program.

Select Candidates

The members of **Show Me Digital Talent Farm** will collaborate and review candidate applications. We will select, pre-screen by telephone, and ultimately interview face-to-face those who we feel have the best chance of success. Candidates will be selected for the apprenticeship not only based on aptitude, personality, drive/motivation, and interest, but also their personal circumstances. In this proposal we have identified several prospective sources of candidate recruitment – different personal circumstances - and we will strive to assemble a diverse cohort of apprentices.

Identify Projects

In our fully developed **Show Me Digital Talent Farm** framework and model for an Application Developer role, we intend to use the ITSD Enterprise Project Management Office's Application Portfolio as one source of project work. Identified in the portfolio are 75 Legacy Applications or Websites that are potential for **Show Me Digital Talent Farm** projects. Other sources of project work include assignments that result in efficiencies, stability, or security, bringing about improved customer satisfaction with ITSD. Targeted assignments that allow the Apprentice to exercise their newly learned skills will be sought out with established Application Development Teams, giving the Apprentice an immersive work experience with various ITSD teams throughout their participation in **Show Me Digital Talent Farm**.

Match Projects with Apprentices

Based on the following factors the candidate will be placed on a project to provide on the job training:

- the interests of the candidate;
- the soft skills identified in the assessment of the candidate;
- the projects available; and
- dynamics of the team for the available projects.

Training Program

As we work with DHEWD to define the training plan according to the requirements for a USDOL Registered Apprenticeship, we will utilize existing training resources and tools, as well as on the job training. Where applicable, MO Learning content will be incorporated into the **Show Me Digital Talent Farm** training curriculum set.

Pluralsight online technical training used by ITSD will be the primary training tool for **Show Me Digital Talent Farm**. There are pre-established technical curriculum sets that can be utilized for Apprentices, and unique curriculum sets that can be designed for specific training focus. An example is provided in the Appendix using **ITSD-DOR's Application Development Training Curriculum for .NET Developers.** Pluralsight includes pre-assessment of specific tech skills, directed content learning recommendations, and re-assessment after completion of required content learning.

In this Pluralsight example C# Skill Personalized Skill analysis the learners Strengths and skill Gaps are identified. The second graphic from Pluralsight shows aggregate data for all learners in the C# Skill assessment group, and provides statistics that can be used to show learning progress and success of the Apprentice's technical skill development.

Sample Skill Analysis from Pluralsight
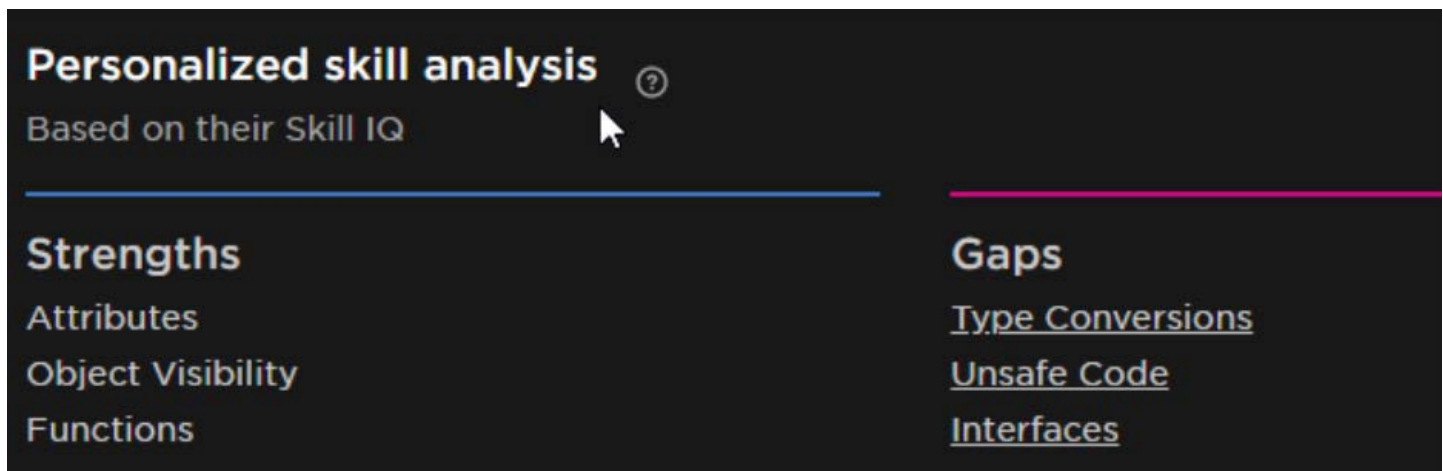
Sample Progression Report from Pluralsight

Funding

According to Tara Dampf, ITSD Fiscal & Administrative Director, there are vacant ITSD positions that can be repurposed for **Show Me Digital Talent Farm** once the program is fully developed and ready to launch.

In discussions with Mardy Leathers, Director, Workforce Development, DHEWD, a pilot of 6-10 maximum apprentices is recommended. Additionally, federal funding opportunities exist for **Show Me Digital Talent Farm** as a Nationally Registered apprenticeship program. This funding ($1800 to $2400 per year-long apprentice) can be used toward costs to develop training, deliver training, and credentialing apprentices.

Who Wins?

State of Missouri. We Grow IT, Missouri Reaps the Harvest.

The State of Missouri has undertaken many initiatives to invest in its employees and statewide workforce. **Show Me Digital Talent Farm** would become a key component in the repertoire of opportunities that would not only benefit the workforce, further reducing unemployment (and under-employment) statistics, but adding significant talent to the IT workforce of the State of Missouri to continue providing quality services to the citizens of the state.

Appendix of Research

LaunchCode

LaunchCode is building a skilled workforce by creating pathways for driven people seeking careers in technology. They help jobseekers - new tech talent from all backgrounds and walks of life - enter the tech field by providing accessible education, training and paid apprenticeship job placement. Back in 2013, Square's Jim McKelvey founded LaunchCode because he realized there was a lack of traditional tech talent to match growing demand. Jim experienced the lack of talent firsthand while trying to get his new company Square started in his hometown of St. Louis, MO. Eventually Jim moved Square to California for access to skilled workers, but knew there must be some way to connect the city's rising unemployment with its shortage of tech talent.

"LaunchCode is really two things: the best way to get a job in tech and the best way to attract new talent."

In a way, LaunchCode is a form of staff augmentation with the goal of full-time employment. They partner with companies to understand skillset needs of the business in order to reach out and recruit talent based on passion, drive, and aptitude. They tailor course material based on skillset needs and conduct a training path to get the candidates trained up on the requested skillsets. It is the company's responsibility to find training locations for the candidates. Candidates are not required to have any prior skills or a degree and the course is 100% free for them once they are selected by LaunchCode.

Once the candidate has met all the requirements of LaunchCode and the hiring company, they start an apprenticeship with the hiring company. They start as W-2 employees for LaunchCode and are billed out at $40/hr; the employee receives $20/hr. The goal is to get the employee converted to full-time employment for the company. To maintain a cost/return balance, LaunchCode requests that hiring companies refrain from hiring apprentices as full-time employees for a minimum of 90 days.

LaunchCode has a standard class (LC101), that addresses the basic technology curriculum and is included as part of their program. They will custom tailor additional course material to the specific requirements of the hiring company for a fee. Their LC101 class usually consists of 150 students and has a graduation rate of about 65%. They state their usual number of applicants per session is 1200; that group is reduced to 150 by various screening and aptitude testing conducted by LaunchCode. LaunchCode works with many well-known companies to obtain professional training, such as Scrum.org, and since they are a non-profit organization they are able to obtain these services at discounted rates. They can also utilize customized training curriculums they develop for the apprenticeship program to engage with and skill up a company's current employees. This can be as a common cohort of current employees or by immersing them into the apprenticeship training along with the apprentice cohorts.

Catalyte

Catalyte, a workforce data science company with development centers in Baltimore, Boston, Chicago, Denver and Portland, OR, has created a diverse, US-based technology workforce to help companies close the talent gap and scale software innovation.

They take a straightforward approach to advertising their 5-month training program for qualified individuals.

"No experience? No problem. Catalyte offers a training program to become a software developer."

To start, applicants take a two-hour online screening, which helps Catalyte determine if they have the aptitude to become a great software developer at Catalyte.
Selected applicants enter into a training and apprenticeship program. The first part of this program consists of an in-classroom cohort-based training program. Training to become a full-stack enterprise software developer is 17-20 weeks. The program teaches agile software development methodologies, so all teams can develop faster, more iterative and innovative software.

Once training has been successfully completed, apprentice graduates are hired as full-time employees of Catalyte. After transitioning they continue to participate in the apprenticeship program for two years where they continue to build technical, soft and consultative skills. Apprentices are deployed as developers on teams for product engineering and managed services projects for Fortune 1000 clients.

Catalyte's program has proven very successful and many of their apprentice alumni continue to soar. 83% stay in technology and land opportunities at companies like Amazon, Nike and Microsoft. Those who stay in technology, 85% continue their careers as developers or senior developers, 10% continue as technical leads and 5% continue as business analysts or project managers.

Catalyte offers the training program for free with the caveat that those who are trained by Catalyte commit to working for them for two years. They value their training at $25,000 and that's why they are so selective in candidates that join the program. Those who successfully complete the program, are eligible for a job, including health benefits.

The starting pay is a minimum of $17 per hour, or just at $36,000 per year, plus overtime, paid holidays and time-off, training allowance, health, vision and dental benefits eligibility. In return, they commit themselves to success, first in the training and then on the job. By working for Catalyte for at least two years with opportunities for promotions, apprentices receive valuable training for free. Additionally they benefit from a structured mentorship program, support from their peers and leaders and continuous professional development training.

Catalyte is are extremely selective in offering positions in the training program. All applicants must:
- Be interested in pursuing a career in software delivery and technology
- Have basic proficiency using a PC in a networked environment and the internet
- Be at least 18 years old
- Be a U.S. citizen or eligible to work in the U.S. for thirty continuous months from the first day of training Catalyte does not offer visa assistance or sponsorship of any kind
- Have a 10th grade or better reading and math ability
- No felonies or misdemeanors of a violent nature
- Have been free of all illegal drug use for the past eighteen months

IBM

https://www.insidehighered.com/digital-learning/article/2019/10/29/interview-ibm-official-about-companys-new-collar-push-look

IBM Looks Beyond the College Degree

The tech company is looking for different ways to fill "new-collar" jobs in its 360,000-employee workforce by adding digital badges and apprenticeships and deepening partnerships with community colleges.

By Paul Fain
October 29, 2019

https://newsroom.ibm.com/2017-06-07-IBM-to-Expand-New-Collar-Career-Partnerships-with-U-S-Community-Colleges

In June 2017 IBM announced its intent to expand partnerships with numerous community colleges in the United States to better prepare more Americans for "New Collar" career opportunities.
In these well-paying roles, in-demand technology skills are valued more than credentials, and a traditional four-year college degree may not always be required.

In addition to collaborating on curricula design for next generation IT skills, IBM works with community colleges near its major U.S. facilities to offer more local students the opportunity to participate in internships and apprenticeships within the company, as well as direct hiring for IBM. "IBM has had real success tapping into a talent pool that doesn't have traditional degrees. Last year alone (2016), these New Collar professionals accounted for around 15% of our U.S. hiring," said Sam Ladah, IBM's vice president of talent.

IBM is working with Moberly Area Community College (MACC) in Moberly, MO
to recruit New Collar positions through a major hiring initiative. The first class of New Collar
interns, many of whom attend MACC, started with IBM in the spring of 2017.

Partnering with State of Missouri Adult Education & Literacy (AEL) and Workforce Innovation and Opportunity Act (WIOA) service providers and workforce development partners, IBM and Moberly Area Community College designed an apprenticeship program to address the need for IT Talent in the Columbia Missouri region. "The IT industry is projected as one of the top ten occupations in Missouri and has shown a positive growth of over 30% in both Northeast and Central regions of Missouri. In addition, over 1,500 job postings in Missouri were listed in the last six months for top demand IT jobs with 363 IT jobs presently listed in Columbia on Indeed.com.

Despite a population of highly qualified residents, Columbia struggles to find trained IT employees and there is a great disparity in employability for minority and young populations. The City of Columbia's 2016-2019 Strategic Plan found white unemployment at 4.4% and black unemployment at 15.7%. City leadership made a priority of addressing the "growing gap between skills our employers need and skills our residents possess."

According to data provided by several sources, minorities and the unemployed or underemployed adult population encounter several barriers to training and employment. Area employers
report that job applicants within this group often lack the soft skills necessary to successfully gain employment." ~IBM and MACC Apprenticeship Proposal.

State of California Government Operations Agency (GovOps)

Announced in an article published November 15, 2019 "New apprenticeships offer fast-track to California IT jobs".

https://www.sacbee.com/news/politics-government/the-state-worker/article237381589.htmlOF 2019

The Best St. Louis Coding Bootcamps

https://www.coursereport.com/cities/st-louis

ITSD-DOR .Net Application Developer Training Program

This training is meant to introduce new employees to the core skills needed to be successful as a .Net Application Developer. The training has been divided into phases, of which each phase will build upon the previous phase, so that at the end of this training a new employee understands full-stack development. The training will be provided through a combination of online courses, hands-on exercises, and one-on-one training by a team lead. The program objectives are as follows:

- Help train new employees as efficiently as possible
- Build a strong foundation for comprehension and understanding
- Yield productive employees more efficiently
- Produce full stack developers
- Improvement in role-based and skill-based tests results, where applicable

Phase One

Phase one introduces new employees to the .Net environment through hands-on development and builds a strong foundational understanding. The trainee will create a new MVC project, create HTML pages, and work with JavaScript, JQuery, and CSS. The project has little business rules and is meant to familiarize the trainee with the most basic understanding of web development.

Phase One Objectives

- Completion and understanding of all courses found in the DOR- .Net Phase I channel in Pluralsight (**https://app.pluralsight.com/channels**)
- Complete role-based and/or skill-based tests, where applicable
- MVC
- C# or Visual Basic
- HTML
- CSS
- JavaScript
- JQuery

Phase Two

Phase two builds on phase one through the use of business rules and provides a structure to the solutions that is more in line with the type of work performed by application developers. Using the phase one project, trainees are instructed to create a form where user data can be collected, evaluated, and sent to a new HTML page.

Phase Two Objectives

- Completion and understanding of all courses found in the DOR- .Net Phase II channel in Pluralsight (**https://app.pluralsight.com/channels**)
- Complete role-based and/or skill-based tests, where applicable
- All phase one objectives
- RAZER
- JavaScript
- JavaScript files
- Ajax
- HTML Post
- Views/Partial Views
- Layout Page
- Object-oriented programing
- Classes/Models
- Constructors
- Inheritance

Phase Three

Phase three continues to build on the skills through a structured training project. The training project mimics commonly used application architectures, while using current application standards. The project introduces the trainee to a distributed application where display and business logic is separated by type and process. The trainee completes tasks that closely resemble the types seen in most projects.

Phase Three Objectives

- Completion and understanding of all courses found in the DOR- .Net Phase III channel in Pluralsight (**https://app.pluralsight.com/channels**)
- Complete role-based and/or skill-based tests, where applicable
- All phase one and two objectives
- Models
- DevOps
- Source control
- Distributed application architecture
- LINQ
- SQL
- Relational Database
- Service References
- DOR Application Standers
- Reusable File structure
- Work Items/DevOps Tasks
- Time estimates
- Web form application

Report: Missouri Employers Struggle To Find Qualified Workers

https://www.kcur.org/post/report-missouri-employers-struggle-find-qualified-workers#stream/0

Employers complained that many workers don't have "soft skills," failing to understand or meet workplace expectations regarding dependability, honesty, professional behavior and communication. They also reported that workers often don't have enough technical skills, and basic knowledge such as spoken or written English.

Employers in Kansas are also struggling to find qualified workers, Pinkerton says, adding that employers across the country are having trouble filling high-tech positions.

But the skill gap is not the only problem. The U.S. workforce is also on the edge of a demographic crisis.

Missouri has 1.6 million people between the ages of 44 and 65 who are expected to retire in next 20 years, according to the Missouri Chamber of Commerce report. However, only 1.4 million Missourians under 18 are expected to fill positions left open when the older workers retire, creating a shortage of 200,000 workers.

That's assuming all those young people stay in Missouri.

Meanwhile, Missouri is growing jobs, especially in industries such as systems design, architecture and engineering, and aerospace. The technical sector in the Midwest is growing at double the rate of the national average, according to a 2018 economic forecast by the Mid-America Regional Council.

As Missouri's economy heads into the 21st century, all sectors may a face crisis

Jul. 24 2018 News Tribune

As Missouri's economy heads further into the 21st century, companies of all sectors may a face crisis in the coming years.

https://www.newstribune.com/news/business/story/2018/jul/24/changing-with-the-times/735743/

This article appeared in the July 23, 2018, edition of #jcmo Inside Business.

Academia and state leaders suggest relief may be on the way. Professors at Missouri's colleges and universities said enrollment in IT programs are booming. State leaders hope changes made by a pair of task forces will prepare the state's workforce for the decades ahead.

In the modern economy, every business from financial institutions to agriculture businesses to manufacturers and printers need information technology specialists and computer programmers. As manufacturing becomes more automated and the internet of things connects more things to the web, the demand for workers with computer science degrees will only continue to increase, academic sources said.

Shaun Sappenfield, existing business manager at the Jefferson City Area Chamber of Commerce,

said companies around the region have struggled to find tech workers for "quite some time." Sappenfield said he's sure the shortage of tech workers statewide has impacts locally, but he can't pinpoint any cases of companies being unable to conduct business.

Missouri's unemployment rate stayed flat at 3.6% in April, the last month for which data was available as of publication. Jefferson City's unemployment rate sat lower at 2.7%. Companies across the region said they began to say they have trouble finding qualified job applicants in most fields months ago.

Mehan and Sappenfield said companies looking for workers in the tech industry often find themselves competing for candidates who want to move to larger cities or tech hubs like Kansas City; Austin, Texas; or Silicon Valley.

"There's just less and less opportunity in rural Missouri," Mehan said. "In general, there's just a flocking to cities."

Well-paid jobs

By and large, jobs in tech fields pay well. U.S. tech sector jobs employed 11.5 million people and had an average wage of $112,890 in 2017, according to a March study by tech trade association CompTIA.

The tech sector in Missouri's eight bordering states paid an average of $80,084, according to data from the study analyzed by the News Tribune.

Missouri's tech sector jobs employed 203,200 people in 2017. Tech jobs statewide paid an average of $88,560 in 2017, according to the report. The pay was 89% higher than the average for non-tech sector jobs of $46,770.
Last year, the tech industry in Missouri gained 3,630 jobs, according to the report. It was No. 19 in the nation.

Though Missouri's average tech wage of $88,560 falls about $24,000 below the national average, the national average tech wage when excluding California sits at just $102,800, according to the CompTIA report. Because the state's average pay for tech sector workers lags behind the rest of the country, Sappenfield and others said companies often pay premiums to attract workers.

"It's the chicken and egg thing," Sappenfield said of attracting workers. "If you need to fill 50 IT-related positions, that's going to have a huge impact on a company's decision whether to expand or locate in a certain location."

Joe Martin, JCPS director of technology, said the district had trouble finding qualified candidates for a technician position it posted in late 2017. When the district did find a good applicant, sometimes the applicant's existing employer swooped in and offered a pay raise to keep him or her.

In March, the JCPS Board of Education allocated $75,000 to increase pay for existing tech support staff. For now, Martin said the district wants to make salaries more competitive just to retain its existing talent.

"It's even more difficult to compete in the government arena because private businesses can pay more," Martin said.

Training the workforce of the future

Like other companies locally, Huber & Associates typically recruits IT and other technical workers from nearby regional colleges like State Tech, Lincoln University and Missouri State University.

Code.org, a nonprofit group backed by tech companies, found, in 2017 that 557,903 open computing jobs existed nationwide, but just 49,291 students graduated into the workforce.

Missouri had 11,090 open computing jobs last year but just 1,138 computer science graduates, according to the group.
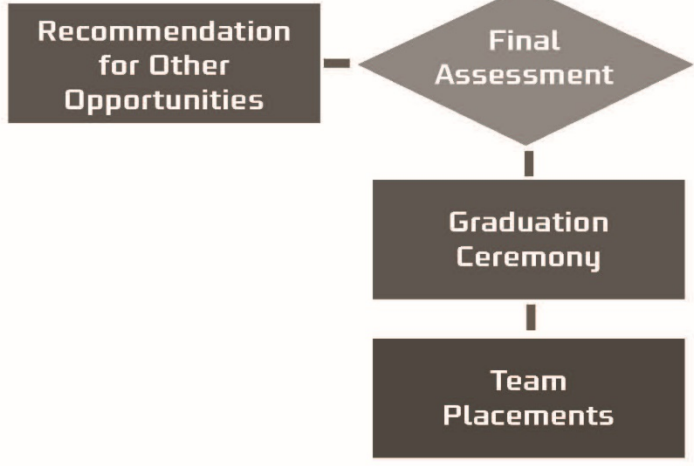
In May, the Missouri Department of Economic Development launched a task force to study how the state's workforce aligns with the needs of its employers. DED Director Rob Dixon said at the time the state needs to know how it can better prepare young workers as the state's economy evolves.

"Ensuring that our economy has available, productive and talented workers is the single most important factor for success in economic development," Rob Dixon, Missouri Department of Economic Development director.

SHOW ME DIGITAL TALENT FARM FRAMEWORK

Recruit Candidates

Assess Candidates

Select Candidates

Identify Projects

Match Projects with Apprentices

APPRENTICESHIP

Feedback

Core Training

Key Project Work

Assess

Mentoring

Recommendation for Other Opportunities

Final Assessment

Graduation Ceremony

Team Placements

Apprenticeship Framework

We will partner with the Department of Higher Education and Workforce Development to create a nationally accredited apprenticeship program. We envision our program will have the key elements shown in the image on the previous page and details below:

Recruit Candidates

We will develop a marketing campaign to recruit individuals that have the desire to be programmers but do not yet have the experience or education to qualify for our entry level positions. We will utilize several recruitment approaches.

- Advertising/marketing targeting current State of MO Workforce
- Apprenticeship Awareness & Informational Meetings
- LinkedIn
- Outreach to State of Missouri citizen services who work with displaced workers, Adult Education & Literacy programs, Injured Workers, Veterans Services, etc.

Assess Candidates

We will utilize standardized assessments that gauge a candidate's ability to think logically, understand complex relationships, quickly comprehend written material, work independently, focus on details and utilize emotional intelligence among other attributes. This will be the key entrance criteria for the candidate. To reduce costs, we will look to start with HireTrue, State of Missouri's new Applicant Tracking System, and look at potential grants that will help pay the cost of the assessments.

We also contacted Walden Testing, a company that pioneered aptitude tests over 40 years ago for programmers, information technology and related fields. An information packet and pricing request was submitted to Walden Testing for potential consideration.

Select Candidates

Candidates will be selected from the qualified list based on the aptitude and an interview process tailored to the apprenticeship program.

Identify Projects

We will identify projects that will be ideal for staff augmentation with Apprentices and the Apprenticeship team. These projects will be tracked in an Apprenticeship Project Backlog.

Match Projects with Apprentices

An important part of the apprenticeship is on the job training. We will match the Apprentices with projects that meet them where they are in there training. Initial project work will be similar to staff augmentation for projects where Apprentices do targeted work to complement their learning. They will focus on specific skillsets around accessibility, security, and front end design work freeing senior staff to

work on more complex assignments. As the Apprentices acquire more advanced skillsets, they will be matched with project work that is more challenging and varied.

Core Training

We will create a core curriculum that will include training paths in Pluralsight, LinkedIn, and internally developed workshops. Each starting apprenticeship group will be put in a path for the area that has the highest need (e.g. .NET programming, API development, Java development, Website development, etc.)

Key Project Work

As modules of the Core Training curriculum are completed, Apprentices will be assigned Key Project Work that reinforces and enhances what they learned in the Core Training.

Mentoring

Each Apprentice will be assigned a Mentor that will support them on his or her journey as a State Employee. The mentorship will not be limited to programming.

Assess

As part of the Core Training, Assessments will be required to be taken along the way. With Pluralsight, the assessments will gauge where the Apprentice has strengths and weaknesses on his/her learning path. Based on that assessment, recommendations are made for key areas to focus learning. Code reviews will be done on a regular basis and senior staff will assess the areas of strengths and weaknesses with Key Project Work. Those assessments will be used to determine what additional Core Training is needed and what Key Project Work the Apprentice is ready to work.

Sample Skill Analysis from Pluralsight

Sample Progression Report from Pluralsight
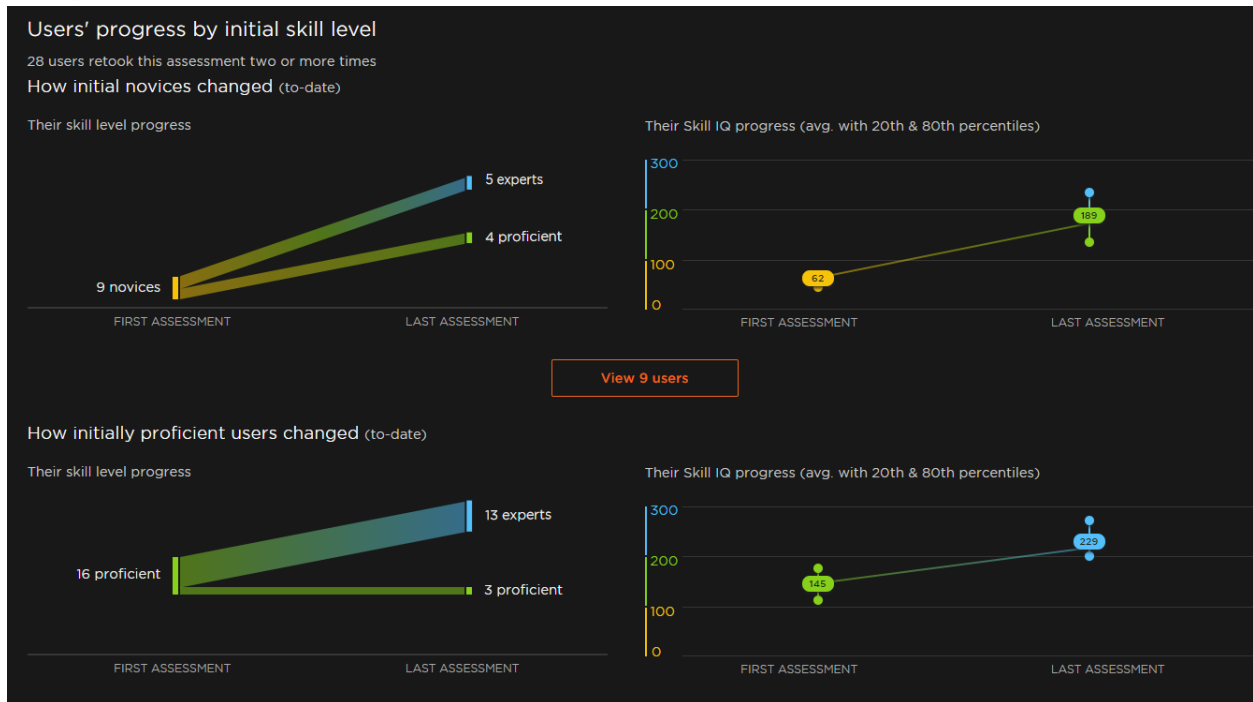
Feedback

Each Apprentice will receive regular feedback from their mentor, the Apprenticeship team, and their supervisor. This feedback will be used by the Apprenticeship team to tailor both training and Key Project Work to provide the best learning environment possible.

Final Assessment

At the end of the Apprenticeship, there will be final assessment to determine the Apprentices "Job Readiness". If successful, the Apprentice will become full time developer in a position level that matches the final assessment.

Graduation Ceremony

Successful Final Assessments will attend a Graduation Ceremony celebrating their accomplishments.

Team Placements

The graduate will be given a list of teams he/she can work with upon graduation and will play a part in making the final decision of which team to join.

Recommendation for Other Opportunities

We recognize that not all Apprentices will be successful in the programming role. While we will try to help the Apprentice along the way with tailored training and jobs, sometimes the role is just not the

right fit. If this is the case, we will work with the Apprentice to see if there are other State opportunities that may be a better fit.