

Achieving Competency: A step-by-step approach using AI to assist learners in acquiring employable skills.

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In today's rapidly evolving job market, it is crucial for adults, especially those at the community college and university levels, to acquire competencies that are both demonstrable and highly valued by employers. To bridge the gap between education and employability, we introduce a comprehensive "Achievement Pipeline." This pipeline is designed to provide a streamlined, cyclical process that ensures learners can effectively showcase their skills and competencies. The Achievement Pipeline consists of four main stages:

1. Assessing Prior Learning
2. Generating Learning Materials
3. Assessing Learner Mastery
4. Generating Digital Credential

Each stage incorporates advanced AI technologies to facilitate personalized learning experiences, robust assessments, and verified digital credentialing. Such a system not only enhances the learning experience but also ensures that the acquired skills meet the demands of the evolving employment landscape. This white paper explores each step of the Achievement Pipeline in detail, highlighting the role of AI in transforming the educational journey and fostering closer collaboration between educational institutions and employers.

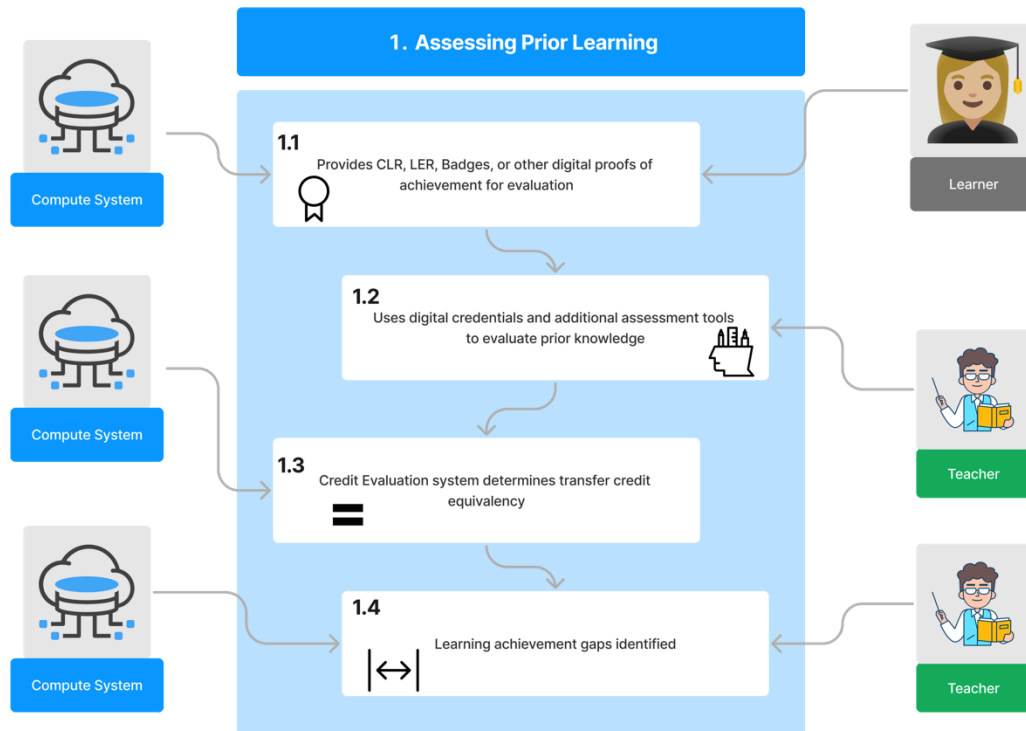


Figure 1. Assessing Prior Learning

The first stage of the Achievement Pipeline involves a thorough assessment of the learner's prior knowledge and achievements. This stage is designed to build a foundational understanding of the learner's existing skills, which will inform the subsequent steps in the pipeline. The process includes four key steps, each supported by advanced computing systems and guided by educators.

Step 1.1: Provision of Digital Proofs of Achievement

In this initial step, learners provide a range of digital proofs of their prior achievements. These proofs can include:

- Comprehensive Learning Record (CLR): A detailed account of the learner's educational history and accomplishments.
- Learning Experience Record (LER): Documentation of specific learning experiences, such as workshops or internships.
- Badges and Certificates: Digital badges, micro-credentials, or certificates that represent specific skills or knowledge areas.

These proofs are uploaded into the system for evaluation, facilitating a comprehensive review of the learner's achievements.

Step 1.2: Evaluation Using Digital Credentials and Assessment Tools

Once the digital proofs are submitted, the system employs various digital credentials and additional assessment tools to evaluate the learner's prior knowledge. This process includes:

- Verification of the authenticity of digital credentials.
- Use of AI-driven assessment tools by an instructor who is a subject matter expert to gauge the depth and breadth of the learner's knowledge in relevant areas.

These evaluations provide a clearer picture of the learner's expertise and areas that require further development.

Step 1.3: Determination of Transfer Credit Equivalency

The system then analyzes the evaluated credentials to determine their equivalency in terms of transferable credits. This credit evaluation system ensures that:

- Prior learning is accurately mapped to the institution's credit framework.
- Learners receive appropriate recognition for their existing knowledge and skills, potentially reducing the time and cost required to complete their current educational trajectory.

Step 1.4: Identification of Learning Achievement Gaps

The final step in assessing prior learning involves identifying any gaps between the learner's current knowledge and the required competencies for their educational and career goals. This includes:

- Analyzing areas where the learner's prior knowledge is insufficient.
- Highlighting specific skills and competencies that need further development.

These identified gaps will guide the personalized learning path in the next stage of the pipeline. By systematically assessing and recognizing prior learning, this stage establishes a robust foundation that allows learners to build on their existing skills efficiently, facilitating a more targeted and streamlined educational journey.

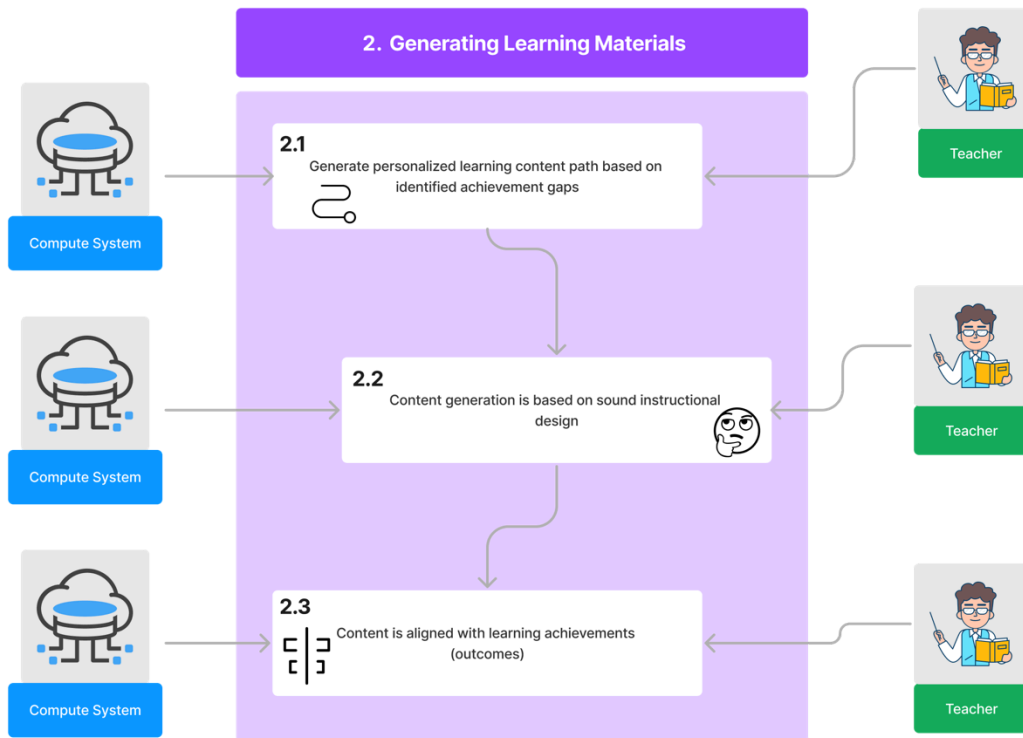


Figure 2. Generating Learning Materials

The second stage of the Achievement Pipeline focuses on the creation of tailored learning materials that address the identified knowledge gaps from the first stage. Leveraging advanced generative AI capabilities, this stage ensures that learners receive personalized content at an unprecedented speed and scale, offering a highly efficient and effective learning experience.

Step 2.1: Generating Personalized Learning Content Path

Based on the learning achievement gaps identified in the prior learning assessment stage, the system generates a personalized learning content path for each learner. This involves:

- Utilizing AI algorithms to analyze the specific needs and preferences of the learner.
- Creating customized learning trajectories that detail the most effective sequence of learning activities and materials.

The Power of Generative AI:

Generative AI plays a critical role in this step by producing vast amounts of tailored learning content quickly and efficiently. Unlike traditional methods that require significant human input and time, generative AI can:

- Generate diverse types of content, including written materials, images, videos, interactive modules, and simulations, all personalized to each learner.
- Continuously adapt content based on real-time learner feedback and performance.

Step 2.2: Ensuring Sound Instructional Design

While AI is indispensable in creating personalized content, the integrity and effectiveness of the learning materials are grounded in sound instructional design principles. This step involves:

- AI systems collaborating with educators to generate content that adheres to established instructional design frameworks.
- Ensuring that learning activities are pedagogically sound and conducive to achieving the desired learning outcomes.

Role of Educators:

Teachers play a crucial role in reviewing and refining AI-generated content to ensure it meets educational standards and effectively addresses the learners' needs.

Step 2.3: Aligning Content with Learning Achievements (Outcomes)

The final step in generating learning materials ensures that all content is tightly aligned with the intended learning outcomes. This involves:

- Using AI to map learning activities and materials directly to specific competencies and skills.
- Continuously monitoring and updating content to keep it relevant and targeted towards achieving the desired outcomes.

By integrating generative AI into the content creation process, educational institutions can provide highly individualized learning experiences that are both scalable and adaptable. This approach not only enhances the efficiency of the educational process but also ensures that learners are consistently engaged with material that is relevant to their specific learning journeys. The Generating Learning Materials stage maximizes the use of AI to deliver personalized, high-quality, and pedagogically sound learning content, setting the stage for effective mastery in the next stage of the Achievement Pipeline.

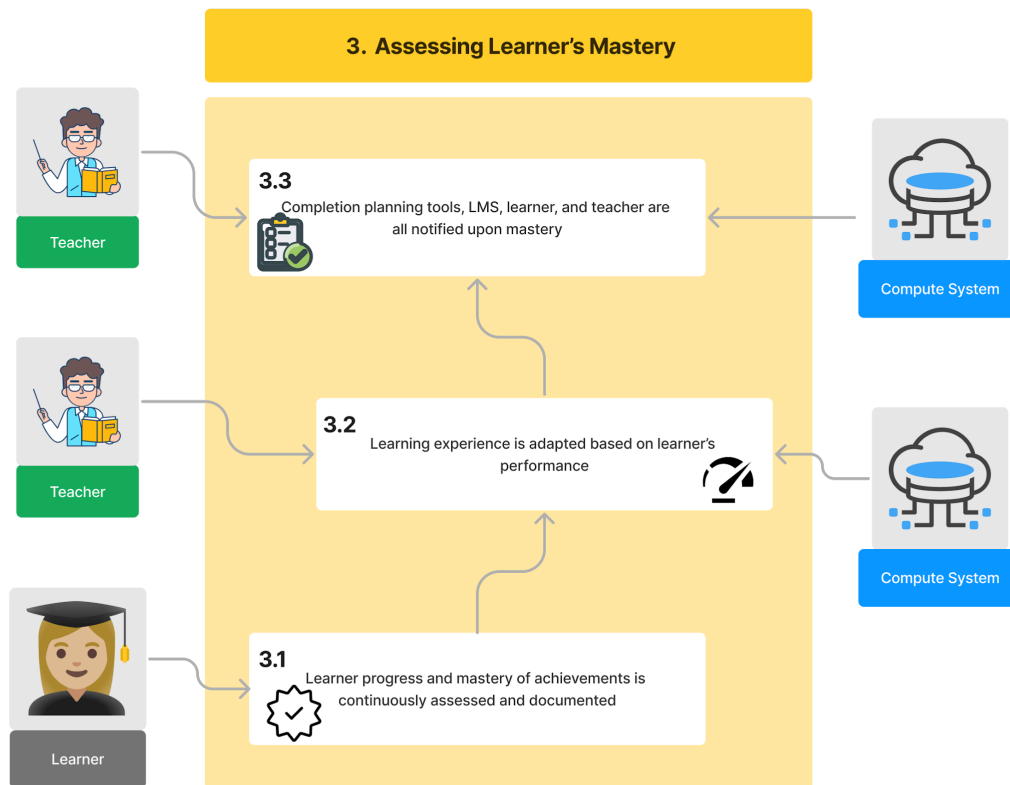


Figure 3. Assessing Learning Mastery

The third stage of the Achievement Pipeline focuses on the continuous evaluation of the learner's progress and the mastery of competencies. This step is crucial for ensuring that learning objectives are being met efficiently and effectively. It involves a dynamic and adaptive assessment process that leverages AI and real-time data to provide actionable insights for learners and educators alike.

Step 3.1: Continuous Assessment and Documentation

The first step in assessing learner mastery involves the continuous assessment and documentation of learner progress. This includes:

- Monitoring learner progress: The system tracks the learner's engagement, performance, and completion of learning activities in real-time.
- Documenting achievements: All accomplishments and milestones are recorded systematically to provide a comprehensive view of the learner's journey.

AI's Role:

Advanced computing systems and AI tools play a key role in continuously assessing learner achievements. They utilize data analytics to provide deep insights into the learner's performance, identifying both strengths and areas for improvement.

Step 3.2: Adapting Learning Experience Based on Performance

Based on the continuous assessment data, the learning experience is adapted to better suit the learner's needs. This involves:

- Personalized adjustments: The AI system dynamically modifies the learning path, content, and difficulty level based on the learner's performance.
- Responsive teaching strategies: Teachers receive real-time data that helps them tailor their instruction and provide targeted support.

Benefits of AI-Driven Adaptation:

By harnessing AI, the learning experience becomes highly responsive and customized. This ensures that learners do not stagnate and are continuously challenged appropriately to foster deeper understanding and skill acquisition.

Step 3.3: Notification and Planning Tools

Upon mastery of specific competencies, the system notifies all relevant parties to facilitate planning and next steps. This includes:

- Completion planning tools: Systems such as Learning Management Systems (LMS) and other planning tools are updated with the latest progress information.
- Notifications: Learners, teachers, and relevant educational platforms are promptly informed of the learner's mastery achievements.

Collaborative Ecosystem:

The collaborative effort between compute systems, educational tools, and instructors ensures a seamless and coherent learning experience. Teachers can plan subsequent learning stages, and learners can see tangible progress, keeping them motivated and focused.

The Assessing Learner's Mastery stage integrates advanced AI capabilities to create a dynamic, adaptive, and continuous assessment process. This ensures that learners receive the necessary support and adjustments to help them master the competencies needed for their educational and career goals, thus maintaining a high level of engagement and effectiveness in the learning process.

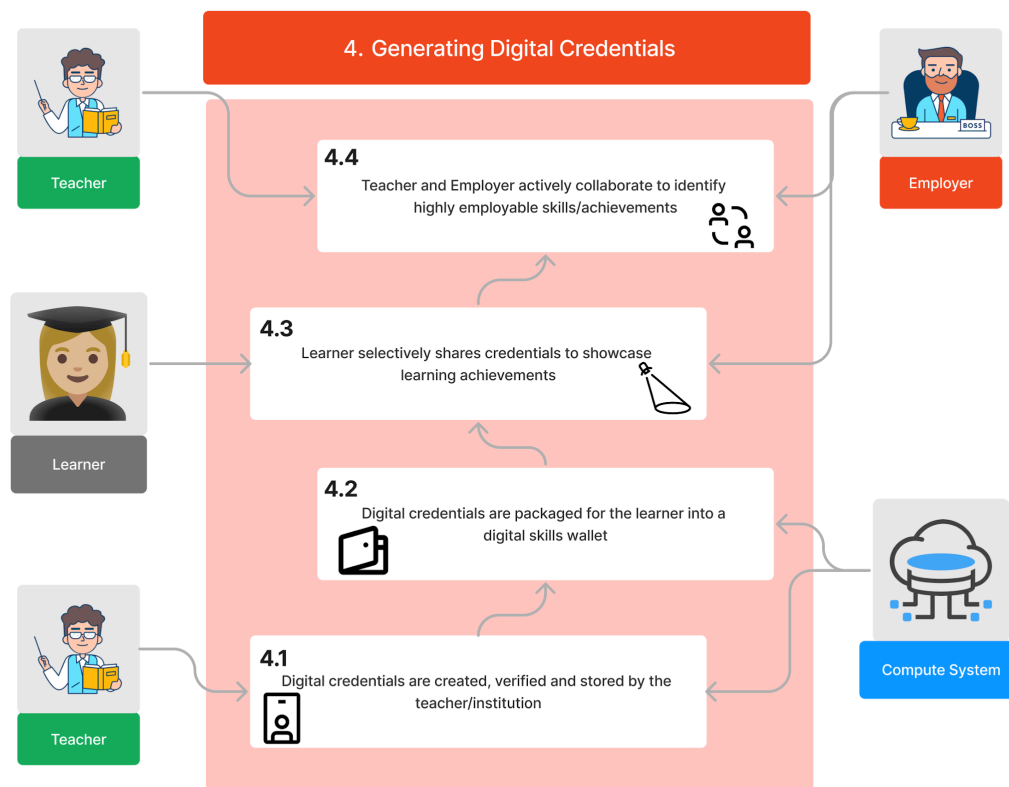


Figure 4. Generating Digital Credentials

The fourth and final stage of the Achievement Pipeline involves the creation, verification, and distribution of digital credentials. This stage ensures that learners can easily showcase their acquired skills and competencies to potential employers. Moreover, it emphasizes the collaboration between educational institutions and employers to continually update and refine the skills taught based on industry needs, fostering a culture of lifelong learning.

Step 4.1: Creation and Verification of Digital Credentials

The process begins with the creation and verification of digital credentials. This involves:

- Credential Creation: Based on the learner's achievements and mastered competencies, digital credentials are generated.
- Verification: These credentials are verified by educators and the institution to ensure they accurately reflect the learner's accomplishments.
- Storage: They are then securely stored within the system, often leveraging blockchain or other secure technologies to maintain integrity and authenticity.

Step 4.2: Packaging Digital Credentials into a Digital Skills Wallet

Once digital credentials are created and verified, they are packaged for the learner into a digital skills wallet. This digital wallet provides:

- Easy Access: Learners can conveniently access, manage, and share their credentials as needed.

- Comprehensive Records: A unified platform where all the learner's achievements are compiled, making it easy to present their skills to potential employers or for further educational opportunities.

Step 4.3: Selectively Sharing Credentials

Learners can selectively share their digital credentials to showcase their learning achievements. This step includes:

- Control & Privacy: Learners maintain control over which credentials they share and with whom, ensuring their privacy and the relevance of the information shared.
- Showcasing Achievements: Learners can tailor their presented skills to align with specific job applications or career opportunities, enhancing their employability.

Step 4.4: Collaboration Between Teachers and Employers

A critical component of this stage is the active collaboration between teachers and employers to identify and update highly employable skills and achievements. This involves:

- Feedback Loop: Employers provide input on the skills and competencies they find most valuable and relevant in the industry.
- Curriculum Updates: Educators use this feedback to continuously update and refine the curriculum, ensuring it remains aligned with the evolving needs of the job market.
- Continuous Up-Skilling: Programs can be designed to allow for continuous up-skilling, enabling learners to stay current and competitive in their fields.

Life-Long Learning and Partnership:

This collaboration creates a synergistic ecosystem where learning is closely aligned with employment needs, and students are encouraged to become lifelong learners. By regularly updating skills and competencies based on employer feedback, educational institutions ensure that learners are prepared for both current and future job markets.

The Generating Digital Credentials stage integrates advanced technologies and collaborative efforts to produce and share verifiable, relevant digital credentials. This ensures that learners can effectively demonstrate their skills in the job market, while the feedback loop between employers and educators fosters a dynamic and responsive educational environment that supports continuous learning and development.

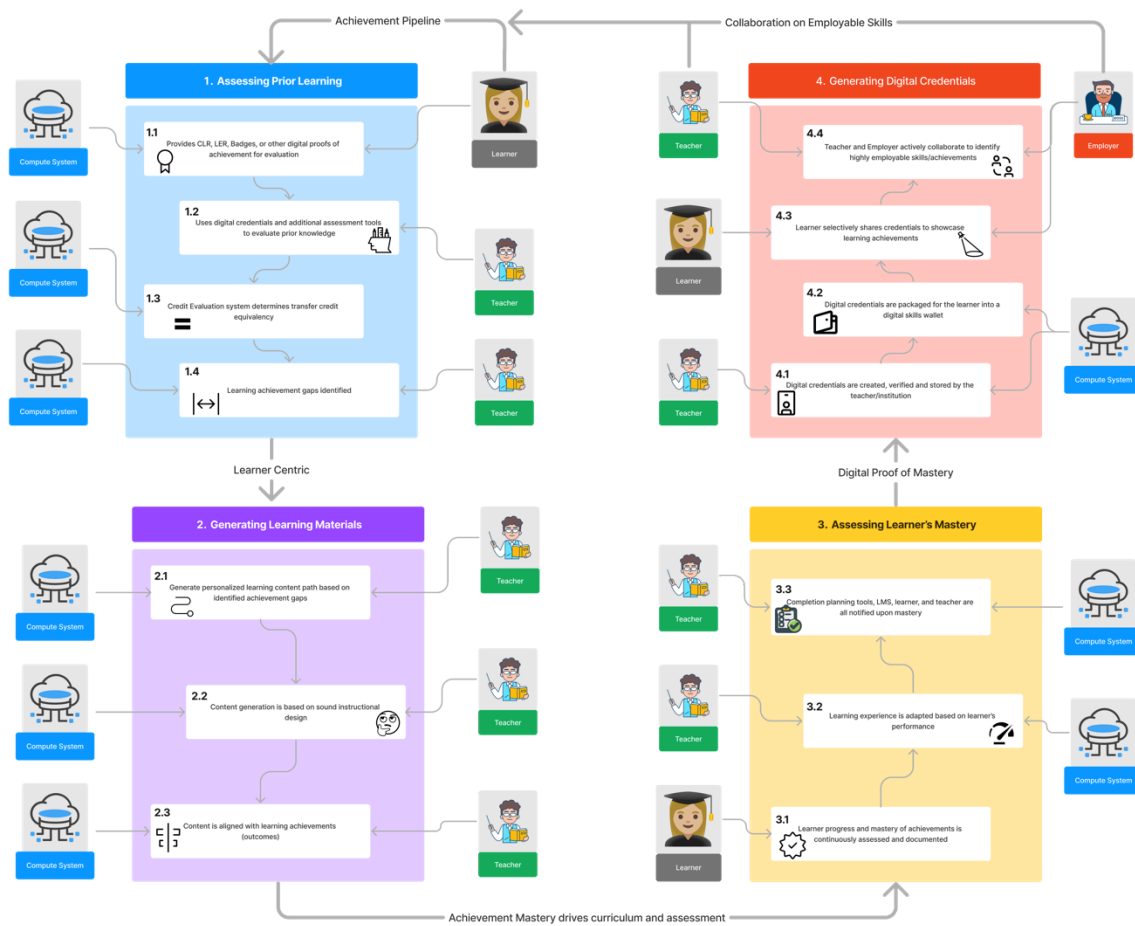


Figure 5. The Achievement Pipeline

Conclusion

The envisioned Achievement Pipeline presents a transformative approach to education, particularly for adult learners at the community college and university level, aiming to bridge the gap between academic learning and employable skills. This process—from assessing prior learning through generating personalized learning materials, to assessing mastery and finally creating digital credentials—ensures an adaptive, efficient, and learner-centered educational experience. While the execution of such an ambitious pipeline involves considerable effort and coordination, recent advancements in Artificial Intelligence make this vision increasingly attainable. AI enables personalized learning at scale, real-time and continuous assessment, dynamic content generation, and robust credentialing, all of which are pivotal elements of the pipeline. More importantly, by fostering collaboration between educational institutions and employers, the Achievement Pipeline supports a culture of lifelong learning, keeping learner skills in step with the evolving job market. As we continue to explore and harness the potential of AI in education, the Achievement Pipeline stands as our guiding model that promises to enhance both individual learner outcomes and broader workforce readiness.

Note

Portions of this paper were written with the help of generative AI. The GPT-4o (“o” for “omni”) model from OpenAI was used to analyze and describe each of the figures used in this paper. I was then able to use that text as a starting point for describing each of the steps represented in the overall Achievement Pipeline diagram.