

A. SIGNIFICANCE

What do you want to be when you grow up? Most people have either asked or answered this familiar question. Whether the reply is “doctor,” “ballet dancer,” “astronaut,” or a combination of all three, children’s hopes and plans for their future jobs are a frequent topic of conversation, focus for creative play and fodder for daydreams.

However, actual *preparation* for such careers, especially for young learners, is unfortunately infrequent. As Jennifer Curry, Ph.D., a professor at Louisiana State University and a former elementary school counselor writes,

The misconception that high school is the time to begin career and college preparation is nothing new but vastly incorrect. Like any area of development, career development is sequential and builds over time. We don’t expect students to arrive to high school and take algebra without prior math courses. Can you imagine how they would react? Yet, there are some schools and districts where exactly that happens with career and college development; some students don’t receive a cohesive career curriculum until they are in their final high school years and are still expected to know how to make thoughtful career and college choices (Curry, 2017).

This lack of career preparation is especially problematic given that making choices around educational and career pathways has never been more challenging. With technology, urbanization, resource scarcity and even weather and health-related crises driving change, the United States’ workforce is evolving at a dizzying pace. Indeed, a multitude of today’s common positions, such as app developer, data security specialist or social media manager, were nonexistent when the current workforce was in kindergarten. Similarly, employment forecasts assert that anywhere between 35% and 65% of children currently entering elementary school will

ultimately work in jobs that don't yet exist (World Economic Forum, 2016). These developments will transform the way we work and live. Some jobs will disappear, others will grow, and careers that don't exist today will become commonplace.

Of course no one can predict tomorrow's workforce with exact accuracy, and employees will always need to stay abreast of new technology and other position-specific practices. However, another trend is likely to continue: employers are increasingly focused on the importance of executive functioning (EF) skills. EF is defined as "neurocognitive skills involved in goal-directed problem solving" (Zelazo et al., 2017). More simply, they are *brain-based skills that are used to control one's thoughts and behaviors to get things done*. Most experts agree that EF is made up of the following three components:

- *Working memory* governs our ability to retain and manipulate distinct pieces of information over short periods of time.
- *Mental flexibility* helps us to sustain or shift attention in response to different demands or to apply different rules in different settings.
- *Self-control* enables us to set priorities and resist impulsive actions or responses (Center on the Developing Child, 2020).

With these categories in mind, everyday workplace skills that would be categorized as EF include paying attention, organizing information or materials, limiting impulsive behavior, displaying persistence around goals, and planning ahead (National Center for Learning Disabilities, 2013). Whether an employee is asked to shepherd a large, long-term project or given a task requiring same-day completion, she must be able to manage time, be a self-starter and avoid procrastination. Even the most interesting jobs feature any variety of dull and pedantic duties (e.g. filling out a timecard, tracking and submitting receipts, etc.), which requires

sustained attention. Few careers involve working in total isolation, so the ability to control emotions and remain flexible is essential for building strong coworker relationships. These instances—and countless more—exemplify how EF skills are commonly used on the job.

However intuitive these skills may seem to seasoned professionals in decades-long careers, EF is *not* second nature to many workforce newcomers. The National Association of Colleges and Employers notes that only 42.5% of employers considered young adults proficient in EF skills like critical thinking/problem solving, teamwork/collaboration, leadership, career management, and global/intercultural fluency (National Association of Colleges and Employers, 2017). And while 77% of students surveyed report feeling confident about their professionalism and work ethic—both qualities that are built on the basic tenants such as interpersonal skills, tenacity and delayed gratification—employers disagree, saying that only 43% of job seekers are proficient in these critical areas (National Association of Colleges and Employers, 2017).

Although economists predict a “Fourth Industrial Revolution,” with advanced robotics and autonomous transport, artificial intelligence, machine learning, biotechnology and genomics, human resource leaders and chief executives still express concern about workers’ EF capacity. The following skills, which are non-technical and rely upon EF abilities, are noted across industries to be the most critical: complex problem solving, critical thinking; creativity; people management; coordinating with others; emotional intelligence; decision-making; service orientation; negotiation and cognitive flexibility (World Economic Forum, 2016).

Handling the demands of any job can be challenging for young people just entering the workforce. Every position presents employees with new routines, responsibilities and people. And while knowledge and “hard skills” garnered from academia and other training or preparatory programs may open the door to many workforce roles, strong EF abilities may be the

key to surviving, thriving and ultimately succeeding at a new job (Rosen, 2019). Further studies identify EF as essential for the preparation and adaptability of our future workforce (Center on the Developing Child, 2020), and there is even evidence that EF skills at school entry are more predictive of school achievement than intelligence (Blair & Razza, 2007).

It is important to note that EF abilities unfold over time, and there is developmental variation in these skills; for example, a seven-year-old may be able to deepen her proficiency to remain attentive, while her five-year-old brother may be developmentally incapable of that skill. Some commonly acknowledged EF skills by age/grade include the following:

- *Kindergarten:* Basic inhibitory control is important as they learn to wait, share, take turns, and practice self-management to follow classroom routines.
- *First grade:* Children build attention skills and concentrate on activities for longer periods of time.
- *Second grade:* Children build their working memory, which requires them to remember directions and multiple steps, and follow through on their plans.

This EF skill acquisition does not end in early childhood. Indeed, EF abilities are deepened and honed throughout adolescence and early adulthood, and continue to grow into adulthood, as the prefrontal cortex continues to develop (Diamond, 2013).

When children have had consistent opportunities to develop executive function and self-regulation skills successfully, research shows lifelong benefits in the following ways:

- *School Achievement:* EF helps children remember and follow multi-step instructions, retain focus, adjust when rules change, plan for and complete long-term assignments and problem-solve. Research also shows that children with stronger EF skills perform better on literacy assessments; when children are first learning to read and write, their executive

function is related to important pre-literacy skills, such as recognizing letters or learning the sounds that letters make. There is also evidence that children with difficulties and disorders related to reading and writing (e.g. dyslexia, dysgraphia) have deficits in EF skills compared to children without such disorders. This suggests that EF skills play an important role in being able to successfully read and write (Sesma et al., 2009).

- *Behaviors*: EF helps children become better team members and leaders, make decisions, set and address goals, think critically, adapt to change and show awareness of their own and others' feelings.
- *Health*: EF helps people make responsible choices around nutrition and exercise; resist pressure around risky behaviors like drug experimentation or unprotected sex; cope with stress and be more aware of the safety of self and others. Proactive EF enrichment may also help children living with conditions like autism, who are likely to struggle with these skills in part due to social challenges and difficulty shifting attention. Children with ADHD and other attention deficit issues are also poised to benefit from early EF intervention because it helps them build positive routines and practices as adolescence approaches (Krieger et al., 2019). For society, the outcome is a healthier population, a more productive workforce, and reduced health care costs.
- *Careers*: EF increases children's potential for future workforce success because they are better organized, able to solve problems, plan and deal with change, and are prepared to adjust to changing circumstances on the job (Center on the Developing Child, 2012).

To better ensure that all students enjoy these EF-related successes, researchers have worked to identify what *causes* children to struggle with these skills. While no single factor results in low EF abilities, several issues—some of which are frequently interrelated—are shown to contribute. Living in poverty is a predictor of EF abilities, with research showing that the number of times a family’s income has fallen below the US poverty level correlates with low EF by age four. This may be due to parental psychosocial stress around finances, which can have a deleterious effect on children’s cognitive development (Raver et al., 2013). Furthermore, child development research has shown that exposure to toxic stress, such as experiencing neglect or abuse, or living in violent or otherwise adverse environments, can seriously delay or impair EF development (Center on the Developing Child, 2012).

While no single root cause has been identified for low EF skills, the consequences are concerning. While multiple studies indicate that children who lack EF abilities face academic challenges, a 2018 longitudinal research study may be the most compelling. A research team at Penn State and the University of California at Irvine found that key EF challenges can emerge as early as kindergarten. This can significantly amplify the likelihood of serious academic problems in the first half of elementary school. Since so much foundational learning occurs during these early primary school years, it becomes very difficult for these children to stay academically abreast with their peers, and builds significant barriers that can plague them throughout their school career (Morgan et al., 2019). Again, this process of early EF challenges leading to long-term academic hardship hits children living in poverty, including those who experience housing insecurity, particularly hard: a strong link between extreme poverty and lack of school readiness has been documented (Masten et al., 2012).

Given this research, it is critical to determine a path forward to provide children with the EF

skills that are clearly recognized as critical to school and career achievement. At present, most students have no formalized way of strengthening their EF abilities. EF enrichment is not commonly taught as a class, and while most parents emphasize and model EF in the course of daily caregiving, many children need a more intentional approach. So how can parents, educators, policymakers and other caring adults help children strengthen EF skills?

The good news is that children *can* learn EF skills if offered support at home, in early daycare and informal education programs, and in school. Caring adults in growth-promoting environments can easily and inexpensively provide children with “scaffolding” by increasing the complexity of tasks step-by-step, ultimately empowering children to reach their “zone of proximal development,” or level at which they are still ably performing the challenge with some adult support, but are not yet frustrated (Vygotsky, 1978). Students also more generally receive EF learning from relationships with present and available parent/primary caregivers, teachers, childcare professionals, coaches, extended family members and healthcare professionals; via activities that broadly promote emotional, social, cognitive, and physical development; and in places that feel safe and have space for creativity, exploration, and exercise (Center on the Developing Child, 2012).

Drawing on these findings around EF and its impact on children’s pathways to academic and future career success, TPT has developed *Mashopolis*. This proposed initiative will employ research-based strategies to build children’s critical EF skills, setting them on a positive journey toward learning and career exploration. By leveraging the powerful reach of public media, *Mashopolis* will reach a large national audience across multiple platforms, engaging diverse children, families and educators with the following approaches:

- *Community Collaboration:* Using human centered design practices, all content will be created both for and with the project’s key demographic, relying on iterative feedback from project advisors, educators and participating families to ensure that content is reflecting, responding to and celebrating the audience’s values, requests and needs.
- *Cultural Responsiveness:* Using the Transformative Transmedia Framework (TTF) and research-based equity strategies produced during TPT’s current Ready To Learn (RTL)-supported initiative *Hero Elementary*, all *Mashopolis* content will be designed to empower, reflect and enrich diverse children and families. All resources will also be made available in Spanish, engaging the United States’ rapidly growing and diverse Latinx community to explore the EF skill development that supports future education and career pathways. (See Appendix E for descriptions of the TTF and *Hero Elementary*’s Equity Strategies.)
- *Best Practices Around Media-Enhanced Learning:* *Mashopolis* will provide educational content through innovative television and interactive learning experiences delivered across an array of platforms and devices. In response to the significant digital divide that is being particularly illuminated during this time of pandemic-related distance learning, technology such as tablets and/or computers will be included as a project deliverable, empowering participation across all socioeconomic levels.

B. PROJECT DESIGN

Mashopolis will use narrative storytelling across transmedia resources to illuminate the EF skills that help support learning and future workforce success. All project components will be shaped by:

- seminal and current research around EF and child development;
- an integrated team that includes experienced media producers, independent researchers, experts in early childhood and informal education, and game design experts;
- diverse writers participating in TPT’s Writer’s Mentorship Program, which will train and empower a community of writers to share their voices and impact the future of television;
- evidence-based research on the most effective uses of television, interactive media and new/emerging technology to significantly improve educational outcomes, maximize engagement and narrow achievement/opportunity gaps; and
- continuous review and improvement through independent formative research and implementation studies with diverse communities, as well as embedded analytics and assessments, all of which allow TPT to iterate and craft engaging and equitable approaches and content.

Specific project deliverables are described below. To ensure high quality, maximum impact and responsiveness to community needs, TPT will develop all deliverables with extensive input from the project’s team of consultants and advisors, as well as educators and families.

Deliverable 1: Develop and nationally distribute 40 *Mashopolis* episodes in English and Spanish.

TPT and Oasis Animation, a leading producer and distributor of television programs for children, will produce 40 half-hour episodes of *Mashopolis*. This innovative and engaging series will inspire children to strengthen the EF skills that provide the foundation for future career and workforce exploration and success. The setting of *Mashopolis*, **inspired by such games as *Minecraft* and *SimCity***, is an immersive game city that allows kids to build their own virtual play space: if they can imagine it, they can *make* it. Such multi-player experiences are reflective of

how many 21st-century children create and communicate. This is increasingly important as the virtual world continues to evolve into a “third place” for children, where they willingly spend time between home and school (Dijkers, 2015; Potter & McDougall, 2017; Steinkuehler & Williams, 2006). Indeed, the utility of virtual spaces has been underscored during the current pandemic, where these spaces have emerged not as just a “third place,” but the *only* place, many youngsters are able to connect.

Each episode opens with the live-action *Mashopolis* kids, a diverse group of three, entering (via their self-created avatars) into the 2D animated world of their favorite simulated city. *Mashopolis*' visual style is clearly identified as a game world, where character-driven narrative stories unfold. Since *Mashopolis* is a kid's idea of an ideal city, it's a mash-up of the things they love: rollercoaster trains, juice box fountains, paper airplane airports and more. And like most major cities, it's *constantly* under construction. Every episode is an opportunity for these kids (well, their avatars) to build onto *Mashopolis* and do the jobs necessary to keep their city going.

While the jobs children perform may be whimsical in *Mashopolis*, they're reflective of real-life careers, in which things don't always go as planned. Good thing *Mashopolis* is populated with a squad of helpers. The city's Worker Bots are tiny, speedy and cute creatures that zip, roll, and fly around town. The kids' favorite friend is an endearing full-sized robot, generated by the game as an additional player and assistant. Great, right? Well, *not exactly*. This robot is so mistake-prone the kids have affectionately named it “Glitch”. Glitch's over-eagerness and “glitchy nature” often causes things to go off the rails, leading to unexpected adventures. Together, the kids and Glitch have to complete game-like challenges, unlock tools and do the jobs necessary to get their city working again.

The game-like challenges the characters experience in *Mashopolis* require them to tap into—and strengthen—their EF skills. For example, they may use cognitive flexibility to figure out how to fire up a broken-down pizza delivery drone once Glitch accidentally loses the remote control, and they might reach deeply into their inhibitory control skills to curb their frustration with their favorite robotic friend. Every time they use EF, they earn rewards and unlock tools that can help them complete a particular job. Each episode will include two animated stories that bring *Mashopolis*' research-based curriculum to life, addressing specific goals around building EF and illuminating future career pathways. Each episode will wrap up with the avatars transforming back into live action characters, who take what they've learned in the city of Mashopolis into their “real life” of playing, creating and learning.

The gaming challenges within the narratives will also be translated into the project's digital games, creating organic transmedia connections and inspiring kids to keep developing their EF skills across multiple *Mashopolis* platforms. Additionally, children will enjoy the series' fun interstitials, rendered in 2D animation and filled EF-themed sing-alongs. Luckily for the *Mashopolis* squad and viewers nationwide, fun is all in a day's work!

Deliverable 2: Develop and distribute a range of educational media products, create an innovative media and gaming platform with built-in assessments, and establish a companion series website.

Digital gaming *matters* to children, and not just because it's fun. Unbeknownst to many parents whose learning centered around books, papers and chalkboards, games provide 21st-century students with opportunities to experiment with the content they're learning and receive immediate individualized feedback on their progress. Gaming is also driven by children's active participation; for example, instead of simply *telling* children about science concepts, educational

games allow players to uncover the information themselves by conducting their own experiments, making errors and adjusting, all in a fun and controlled digital environment. Educational games are also scalable and once developed, can be widely and inexpensively distributed, thanks to the internet lowering the barrier to access for underserved communities.

TPT is committed to making all screen time equitable, educational and fun. To this end, TPT's digital team will leverage the expertise gained through developing *Hero Elementary's* suite of games, apps and e-books to create *Mashopolis'* EF and career-themed digital resources. This work will center around *Ed Tech Developer's Guide* goals, which focus on improving mastery of academic skills; increasing family engagement; designing effective assessments; improving educator professional development; making learning accessible to all students; closing opportunity gaps and closing achievement gaps (US Department of Education, 2015).

All *Mashopolis* digital resources will be developed in partnership with firms that have served as longtime TPT collaborators, contributing to both the *Hero Elementary* and *SciGirls* projects. Australia-based Two Moos, winner of several awards in 2019 including Forbes' "Top Children's AR App of 2019 Award," is known for their youth-focused work, including the "Sesame Street Yourself!" project featured at the 2019 Apple Keynote. Filament Games, based in Madison, Wisconsin, is recognized as an industry leader in game-based learning, and has captured ten awards in the last three years, including Serious Play's 2018 Gold Award. (See Partner biographies in Section C for more detail). Together, this team will produce:

Games: *Mashopolis'* fourteen games, developed in partnership with the project's EF and child development advisors and educational outreach team, will draw on the world and themes of the *Mashopolis* television series, challenging 5-to-8 year olds to strengthen or expand specific EF skills. Each game will target a specific age group's developmental capacity, but will be designed

to appeal to other age groups as much as possible. A similar approach to game creation was employed for the *Hero Elementary* games, which have been successfully used in formal and informal settings with a variety of ages despite the content being aimed at a specific age group. *Mashopolis* games will also emphasize re-playability and feature adaptive difficulty, and will provide interactive tutorials so that gameplay is intuitive and needs little text-based explanation.

To fulfill TPT's commitment to providing equitable access to content, the games will be developed in HTML 5. This format does not require additional plug-ins or specific hardware, can be run on most browsers, and can be ported as native iOS/Android apps. These features render the games as easy to play on public and/or shared devices (such as at libraries, informal education spaces or on the tablets TPT will provide to *Mashopolis* outreach partner organizations) as they would be on a family computer or personal phone, while still maintaining high design and playability standards. For further accessibility, games will have offline versions. This option, requested by *Hero Elementary* educators and parents, helps low-income and/or housing insecure players who may lack reliable internet access.

Games will run on the PBS Springroll platform, and will support Springroll's accessibility plug-in. This enables closed captioning for deaf/hard-of-hearing players, and also allows for presentation customization (i.e. players can adjust game elements such as volume, color and graphic detail). This customization limits distractors, which is beneficial to children who have attention deficiencies, sound sensitivities or other autism spectrum-related challenges, and also makes the game more playable in quiet public spaces.

Family App: To support its efforts around intergenerational learning, the TPT team will also produce an app designed for at-home or on-the-go play. The app will focus on EF skill development and career ideation that parents and children can do collaboratively and playfully,

with push notifications that prompt families to discuss diverse and fun professions. Players will be encouraged to create their own avatars and stylize them with specific physical characteristics, clothing, accessories or tools that they feel best reflect their personalities and dream careers. Parents will be easily able to download/install the free *Mashopolis* Family App through IOS/Android, and it will be made available online. Players may save their progress across the other *Mashopolis* digital games, lending to ongoing learning and adventure. Offline play will also be available for families who lack reliable internet service, and players will be prompted to log into their *Mashopolis* family account to save their game/score.

Analytics: To enable ongoing evaluation, all games will support analytics, and will have embedded EF assessments. The project's Key Personnel have deep academic and professional experience designing such systems, and have either implemented and/or researched them. PI Dr. Hayakawa and Co-PI Dr. Ramirez designed, implemented and analyzed data collected through the *Hero Elementary* program. The data gathered from this program was collected from hundreds of players across 14 games, a set of e-books and multiple videos. Using this data, TPT's *Hero Elementary* team was able to iterate, improve, and better align the digital tools.

TPT will use an analytic logging system based on technology licensed from LRNG/Glass Lab and refined throughout the *Hero Elementary* project. This flexible system can support multiple types of games and genres. TPT will iterate and improve upon this system throughout the *Mashopolis* initiative, building off insight gained from using the LRNG dashboard and relying on feedback from Filament Games and project consultants Drs. Matthew Berland and David Gagnon, who have implemented these dashboards in the classroom and in the wild (see Consultants biographies in Section C for greater detail). Analytics will be used to provide

feedback to players, families and informal educators, and will also inform the design process of *Mashopolis* games and the Mashopolis Family App.

Additionally, analytics will support anonymous data collection (using IP addresses and device IDs instead of log-ins). This will illuminate trends around game usage (e.g. length of play, common actions taken, barriers/obstacles to play, etc.). This general data collection is an industry best practice, with PBS Digital, YouTube and other sites gathering information about user activity that helps to improve resources. Anonymous data collection was also suggested by *Hero Elementary* program facilitators, where participants were required to log in before they played with games and apps, presenting a barrier to entry. Anonymous data will be mainly collected at outreach sites that are not a part of our research study and/or are used by the general public; research sites will require a log-in to track individual students.

Deliverable 3: Develop educational resources and disseminate them via a national outreach initiative that offers professional development training for informal educators at partner organizations and provides hands-on, sustainable EF enrichment programming for children and their families.

The foundation on which all aforementioned television episodes and digital assets will be built is the research-based *Mashopolis* educational outreach curriculum, which will focus on best practices around developing EF skills that support future career pathways. In partnership with the project's advisors, TPT will create 40 in-person activities for children and families that build on content and concepts featured throughout *Mashopolis* media, and align with current grade-level standards and developmental benchmarks. To ensure equitable and culturally appropriate content, *Mashopolis* educational resources will also be developed in concert with the parents and informal educators who represent the project's target audiences.

This content development work echoes and builds upon TPT’s success in creating a suite of engaging and effective educational resources for the *Hero Elementary* initiative, which included analog hands-on activities, analog and digital games, a digital notebook and a family science app. To design these assets, TPT developed the Transformative Transmedia Framework (TTF), which ensures that all content:

- I. Addresses the intersectionality of racial, class, cultural, and academic identities for young learners and dispelling negative stereotypes (Oyserman et al., 2012; McKown & Strambler, 2009; Master & Meltzoff, 2016).
- II. Grounds “real world” experiences in the lived realities of diverse learners (Gay, 2002; Ladson Billings, 1995; Villegas & Lucas, 2002).
- III. Recognizes and integrates social and cultural assets in learning experiences (Thirutnurthy et al., 2010; Garcia & Ozturk, 2018).
- IV. Integrates equity into academic practices (Gay, 2010; Rodriguez & Berryman, 2002).

These guidelines will also shape *Mashopolis* educational outreach resources, making them relatable and engaging for learners within the rapidly diversifying informal learning space. To further support access for all, the following *Mashopolis* analog educational resources will use simple, free or low-cost materials that are readily available to educators and families. Resources and instructions can be downloaded and printed by educators for site-based use or given to adult family members to use with their children at home. Resources will include:

EF Activities (20-25 activities)

- *Analog Games:* These research-based challenges will motivate children to keep playing and trying. The games will be designed for individual and/or small group play, and will emphasize age-appropriate EF skills including working memory, planning, self-control,

organization, flexibility and more. These games may be analog versions of *Mashopolis* digital games or may be wholly unique.

- *Family Activities*: These hands-on activities will be designed to empower intergenerational EF-based learning. Together, children and parents/caregivers enjoy these simple and fun activities at home or even “on-the-go” (e.g. on public transit, at the dentist’s waiting room, in line, etc.), making any time learning time. These activities will also be designed to encourage repetition, lending to “practice” and capacity-building.

Career Exploration Activities (15-20 activities)

- *Career Quests*: Research indicates that kindergarten and early elementary school students enjoy career exploration, with their natural curiosity, imagination and sense of adventure motivating them to investigate the relatable “helping professions” like doctors, firefighters, police officers, cashiers, bakers, EMTs, mail carriers, construction workers, teachers, librarians, trash collectors, all of which help communities prosper (Curry, 2017). To this end, *Mashopolis*’ Career Quests invite children to explore a variety of existing careers, including those in fields that are expected to grow. These explorations will take the form of virtual—or actual—field trips. The project team will research and vet virtual field trip sites and provide informal educators with turn-key tips to plan and implement IRL field trips, and include this information in the Career Quest resources.
- *Role Play*: Role playing is an important way to encourage children to act out various experiences they may have had, or explore something that is of some interest to them. It allows them to experiment with decision making, determine how to behave and practice social skills (Davis, 2011). As a follow-up to Career Quests, TPT will develop activities that support children’s imaginative role-playing of various career possibilities.

Family Resources:

- *Family Reading:* Reading aloud is a fundamentally critical activity for families, fostering not only literacy skills but emotional security (Kris, 2018). TPT will support reading aloud by assembling a collection of age-appropriate children’s books that feature an array of workplaces, show diverse workers and celebrate a variety of abilities and interests. These collections will be made available to partner organizations and via family outreach. TPT will develop a supplementary discussion guide to accompany the book collection.
- *Mashopolis Family Guide:* The project’s Family Guide will help parents and caregivers better understand EF and learn how these skills support their children’s well-being and success in life. This short, relatable resource will be available in both English and Spanish, and may be accessed in digital or print formats.

All *Mashopolis* educational resources will be employed in a multi-year innovative outreach program modeled on its successful *Hero Elementary* initiative, which combined equity strategies and transmedia classroom management principles to help informal educators implement and sustain quality STEM programming for underserved students. Over the five-year *Hero Elementary* development period, TPT established a vibrant and diverse national partner network that includes Latinx-serving organizations, community-based organizations, and museums. Once trained in best practices around fostering an equitable learning space and delivering standards-based STEM programming, participating educators worked within diverse communities, from urban immigrant families living a mile from the United States/Mexico border to housing-subsidized children in rural Louisiana, and also included organizations primarily serving students on the autism spectrum. *Hero Elementary* outreach ultimately engaged over 800 formal and informal educators who continue to work with 2,000 students in low-income communities.

TPT also successfully brought *Hero Elementary's* outreach model to scale through a diverse partnership network of organizations such as YMCAs, Boys and Girls Clubs, and smaller grassroots-level nonprofits like Child First Authority in Baltimore. Participants were 54% Hispanic, 70% historically marginalized, 40% English Language Learners and overall 85% free and reduced lunch. The iterative nature of the *Hero Elementary's* outreach programming, which relies upon advisor and educator feedback and copious pilot testing, also made possible the customization and tailoring of activities and approaches, which helped to address the myriad of learning needs experienced by students from diverse communities and demographics.

Mashopolis will build on these successful TPT models, still collaborating on the grassroots level with out-of-school time partner organizations that focus on underserved and/or low-income children and families. Additionally, TPT will deepen this approach in two ways: by partnering with organizations that work with families facing housing insecurity, and by creating even more intentional intergenerational programming that empowers children and parents/caregivers to learn and grow together long after *Mashopolis* programming is completed.

The proposed outreach initiative will include two programs, both of which emphasize EF skill-building that supports future career/workforce development: The *Mashopolis* Children's Program (MCP) will empower informal educators to provide EF enrichment to children ages 5-8 in out-of-school time settings. The *Mashopolis* Family Program (MFP) will prepare informal educators to work with families around EF development, enabling participating parents/caregivers to continue sharing and practicing the program's activities at home. Outreach planning and implementation will include multiple elements:

MCP Partner Organization Recruitment: Reflective of TPT's commitment to providing sustainable educational opportunities, the MCP's pilot cohort will be made up of partner

organizations that participated in the *Hero Elementary* program. TPT has strategically identified and invited the partner organizations that have been best able to implement transmedia programming to fidelity, and that serve families facing the distinct stressors of housing insecurity, including inadequate nutrition, lack of access to health care, and insufficient childcare options. MCP pilot cohort organizations, which are geographically and demographically diverse, include YMCA DC in Washington, DC; Boys and Girls Club in Albuquerque, New Mexico; Girls Incorporated of Oak Ridge, TN; Freedom Schools in St. Paul, MN; Volunteers of America in Shreveport, Louisiana; and Smart Girls HQ in Charlotte, North Carolina. Please see letters of support in Appendix C. MCP programming will begin in Year Two and run through Year Five; see “Project Scale-Up” in this section for more information.

MFP Partner Organization Recruitment: Through family engagement, the MFP will help parents/caregivers develop their children’s EF skills by using best practices in intergenerational learning. Family recruitment will occur within existing *Hero Elementary* partner organizations, particularly the 35% of existing organizations that are Latinx-serving; anecdotally, parents within these organizations expressed significantly higher interest in family-based programming. MFP participant recruitment will also take place within the American Library Association (ALA), whose affiliate libraries in every state annually host more than 92.6 million people at four million public library programs. MFP is a six-week program, bookended by a kick-off event and culminating celebration. Families are asked to spend an average of 20 minutes per day sharing, exploring and learning from *Mashopolis*’ analog and digital resources. An additional project component, titled the Innovation MFP (IMFP), will work to identify spaces where families in our target audiences experience downtime, such as laundromats, parks, transportation hubs, etc. The objective of this IMFP is to provide “pop-up” EF learning opportunities in places families

already gather. The MFP will begin in Year 3 and the IMFP will begin in Year Four – both will run through Year Five; see “Project Scale-Up” in this section for more information.

Professional Development Workshops: The TPT team will craft professional development workshops that provide the informal educators participating within the MCP and MFP with the best practices needed to implement *Mashopolis* programming. TPT’s blended training approach, also successfully employed in *Hero Elementary*, will include one full-day, in-person workshop augmented by one online workshop. Bimonthly webinars will provide additional support, and ongoing email, telephone and virtual communication with the TPT team and other participating partner organizations will help to strengthen the professional learning communities that are already thriving on TPT’s Canvas platform. Participating educators may also opt to undertake an additional workshop to learn to become *Mashopolis* Certified Trainers, which prepares them to lead *Mashopolis* trainings in their own and other communities. This Train-the-Trainer model, employed in both *Hero Elementary* and *SciGirls*, has significantly amplified programmatic reach. Please note that all *Mashopolis* professional development is iterative: with feedback from participating educators, TPT will refine and revise trainings to suit community needs.

Program Implementation and Scale-Up: The MCP and MFP will be continuously implemented at partner sites throughout the project. Partner organizations will scale as follows: the MCP will ultimately include 25 partner organizations, the MFP will include ten and the IMFP include five, totaling 40 organizations serving an estimated 2,000 children and families.

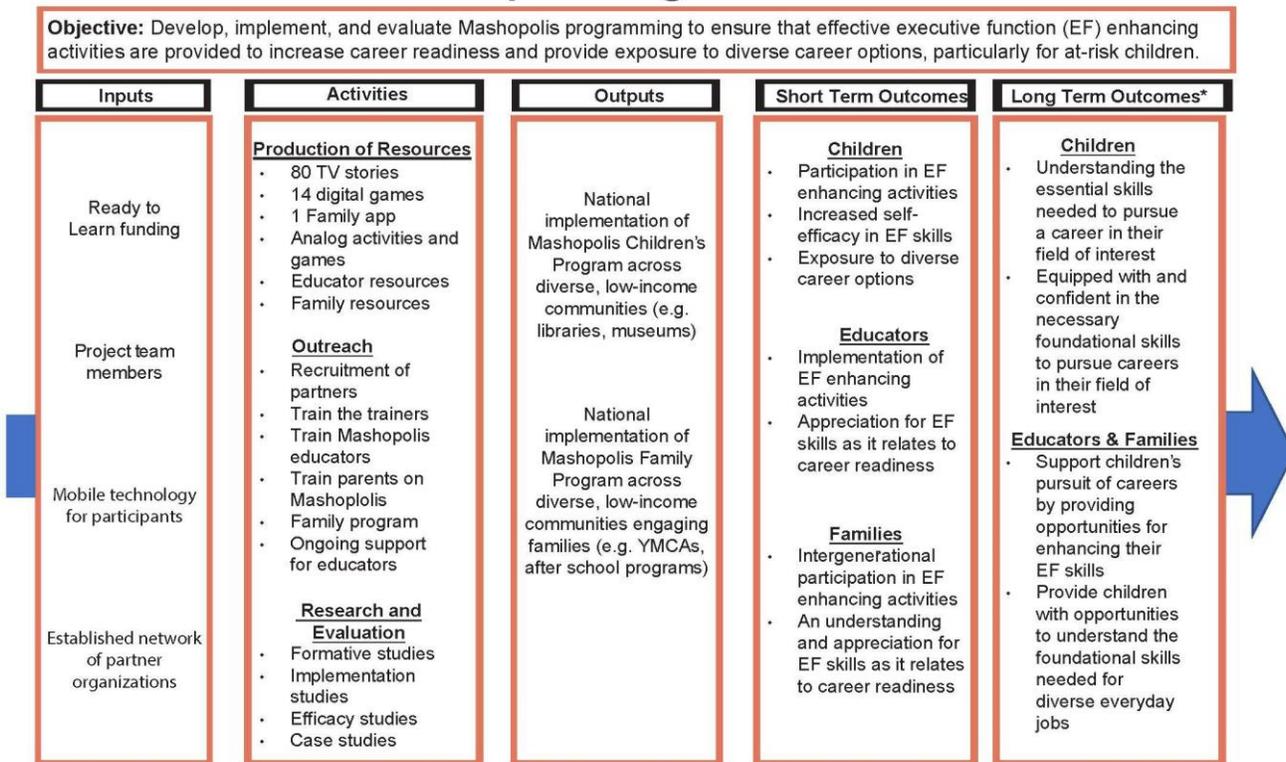
Use of Technology/Distance Learning Considerations: A tangible “digital divide,” in which underserved communities experience low access to technological devices, is a common obstacle to educational program delivery. In response, *Mashopolis* will incorporate a strong focus on providing access to technology, both through practices outlined in Deliverable 2 and by

supplying tablets and other devices to participating partner organizations.

It is also important to note TPT has experience, within its *Hero Elementary*, *SciGirls* and other NSF and NIH-funded programs, with leveraging technology for virtual/distance learning. This has been vividly demonstrated throughout the current pandemic, during which TPT has moved professional development workshops, research efforts and even select children/family programming to the online space, keeping educational initiatives moving forward during this time of shelter-in-place. Throughout *Mashopolis* project development, the TPT team will not only consider adapting educational resources, but *designing* them specifically for flexible use. This increases the resources' utility for virtual/distance learning, whether during emergency situations or simply to routinely reach rural or otherwise geographically isolated learners.

The *Mashopolis* project design is summarized in the Logic Model below:

Mashopolis Logic Model



*Determining long-term outcomes is not within the scope of this grant proposal

C. STRATEGY TO SCALE

Capacity to Develop and Bring the Project to Scale

TPT's mission is to enrich lives and strengthen communities through the power of public media. Based in St. Paul, Minnesota, it is one of the highest-rated PBS stations in the nation, reaching more than 3.4 million people every month through multiple broadcast and online channels and acting as a primary provider of programming for the public television system. Notable recent primetime projects include the 2019 science documentary *When Whales Walked: Journeys in Deep Time* and the six-part history series *The Dictators' Playbook*. TPT also produced the Sundance Film Festival-nominated *Slavery by Another Name*, the Emmy Award-winning *The Forgetting: A Portrait of Alzheimer's*; and the Peabody Award-winning *Depression: Out of the Darkness* and *Liberty! The American Revolution*. TPT National Productions has been honored with 25 national and regional Emmy Awards, three George Foster Peabody Awards, the duPont-Columbia Commendation, and an Academy Award nomination for *Hoop Dreams*, named "Best Documentary of the 1990s" by film critic Roger Ebert.

TPT has also fostered a 30-year track record of producing high-quality science television series for children, which include aligned interactive experiences and educational outreach programming for underserved and/or low-income youth. These projects exemplify how TPT, with its management structure, experienced staff, and station resources, has the capacity to:

- manage large-scale, complex, federally-funded projects, and deliver high-quality content on time and on budget;
- create educational, appealing, award-winning television for broadcast by PBS;
- craft award-winning educational digital games and resources;
- establish an integrated team approach for the production of all media;
- develop and deliver high quality professional development workshops to formal and

informal educators that demonstrably increase learning gains;

- foster, maintain and deepen partnerships with diverse stakeholders, amplifying the reach of all media and educational outreach resources;
- align all content with best practices around gender equity and cultural responsiveness, providing Spanish translations and ensuring that content is free and accessible;
- leverage federal funding to attract additional corporate and foundation grants that extend the reach and impact of projects nationwide; and
- sustain projects for many years beyond initial funding.

TPT's commitment to producing STEM media for children and families began with *Newton's Apple*. This series, originally hosted by Ira Flatow of NPR's *Science Friday* and sponsored by 3M, ran from 1983–1998 on public media stations nationwide. *Newton's Apple* captured a national Emmy Award for Outstanding Children's Series, as well as the AAAS Science Journalism Award, Television Parents' Choice Award, and National Education Association Award, and was an early adopter of interactive educational engagement, producing a then-pioneering CD-ROM collection featuring videos, interactive lessons, and games.

TPT's *DragonflyTV* series highlighted real children doing real science. Supported by the NSF and Best Buy Children's Foundation, the series' seven seasons were broadcast on public television from 2002–2009, garnering two Emmy Awards and multiple Parents' Choice awards. The project also featured nationwide youth outreach programming, professional development workshops for educators and a popular PBS Kids website. *DragonflyTV's* media-enriched STEM activities continue to reach educators via PBS Learning Media, and the project's third-party evaluations noted that the series effectively demonstrated clear relationships, comparisons, procedures and results and provided clear age-appropriate explanations. Furthermore, children

reported greater interest in science after viewing *DragonflyTV* (Flagg, 2009).

DragonflyTV prompted the spinoff project *SciGirls*, first launched in 2005 as a national educational outreach project specifically created in response to research indicating that girls—particularly girls of color and of low socioeconomic status—start losing interest and confidence in STEM during middle school, and this decline often continues as girls get older (Allen & Eisenhart, 2017; Bian, Leslie & Cimpian, 2017; Dasgupta & Stout, 2014). Multiple sociocultural barriers contribute to girls’ loss of confidence including gender and ethnic stereotypes; lack of gender equitable and culturally responsive programming; limited exposure to women role models; lack of knowledge of STEM careers and few or no hands-on STEM experiences (Allen & Eisenhart, 2017; Archer et al., 2013; Bian et al., 2017; Capobianco et al., 2015; Malcom-Piqueux & Malcolm, 2013; Régner et al., 2016).

Because these barriers to gender equity in STEM engagement remain, so does *SciGirls*, a multimedia initiative that has received sustainable NSF support for 15 years. Each half-hour episode follows a different group of real middle school girls and their STEM professional role models on fun, science-fueled adventures that inspire viewers to pursue STEM careers. *SciGirls*’ sixth season will premiere in 2021, and its seventh season recently received NSF funding.

All *SciGirls* media, youth activities and professional development is based on *The SciGirls Strategies: How to Engage Girls in STEM* (Twin Cities PBS, 2019), a set of research-based strategies proven to help educators create gender equitable and culturally responsive STEM learning experiences. The *SciGirls Strategies* inform and support the *SciGirls* CONNECT Network, a collection of 205 partner organizations that have engaged 85,000 children in standards-based STEM learning. The *SciGirls Strategies* also guide TPT’s commitment to collaborating with Latinx communities, which is reflected in the NSF-funded outreach programs

SciGirls en Espanol and *SciGirls en la Familia*, as well as the *Latina SciGirls* season, an innovative Spanish-first series broadcast on PBS Kids.

In addition to a large national reach, *SciGirls* programming also demonstrates impact. Third-party evaluations of multiple *SciGirls*' outreach initiatives consistently show that teachers believe *SciGirls*' resources are reliable tools that build girls' confidence, deepen STEM skills and spark a passion for science (Knight-Williams, 2008, 2010, 2012, 2014). Recent evaluation also shows that a majority of girls participating in *SciGirls* programs reported an increased awareness of and interest in STEM jobs, a heightened understanding of the preparation needed to achieve these careers (Knight-Williams, 2019). Educators also deemed the *SciGirls Strategies* "very effective" in engaging diverse girls in a culturally responsive way (Knight-Williams, 2019).

TPT's latest proof of educational efficacy is reflected in its *Hero Elementary* initiative. All project components, which are aligned with Next Generation Science Standards and Common Core State Standards for English Language Arts, improve school readiness in science and literacy for children grades K-2 and their families nationwide, with an emphasis on Latinx communities, English Language Learners, youth with disabilities, and children from low-income households. These resources include an animated PBS Kids television series; digital and analog games and apps; non-fiction e-books; hands-on activities; parent/caregiver enrichment materials and a learning platform with thematic playlists with embedded learning analytics. Although the project has not yet undergone summative evaluation, preliminary assessments show impact. Designed around research showing that transmedia engages multiple literacies (e.g. textual, visual, and media) and includes multiple intelligences (Herr-Stephenson et al., 2013), WestEd's evaluation shows improvement in children's understanding of science content and practices, as well as increased ability to articulate scientific thinking. Participating children also experienced

attitudinal change toward science and technology, demonstrating increased self-concept, curiosity and positivity around learning (Li et al., 2019).

TPT will bring this rich experience around educational media production to the development of *Mashopolis*. The success of the project will be further enriched by our collaboration with production partners, including television production companies Oasis Animation and Hot Spaghetti, and digital firms Two Moos and Filament, whose organizational bios appear later in this section and Letters of Commitment appear in Appendix C.

Broad Dissemination of Project Components

The guiding strategy for *Mashopolis* is to create a project that plays on the traditional strengths of the public media system while remaining nimble (and curious) enough to innovate and create opportunities across the greater media landscape. TPT’s plan to extend the project into new settings is designed to be flexible and responsive, always with the underlying goal of reaching underserved and/or low-income children (including those who experience housing insecurity), their families and their informal educators. TPT will disseminate content across:

Television and Digital Media: Across multiple projects, TPT has worked with PBS Kids to create and deliver broadcast television and interactive media that meets their high standards for quality and educational content. This is most recently demonstrated by PBS Kids’ collaboration around and national carriage of TPT’s *Hero Elementary* project, as well as the sustainable placement of *SciGirls* and *DragonflyTV* on PBS Plus. PBS currently cannot (and has traditionally declined) to provide any single RTL applicant with a formal letter of support. However, PBS has indicated an openness to collaborating with awardees—including TPT— to pursue the mutual goal of broad dissemination of high quality educational content to diverse audiences. The TPT team anticipates that the positive and productive relationship currently shared with PBS Kids

will help to foster placement of *Mashopolis* within its broadcast platform, annually reaching 18 million children ages 2-8, and across PBS Kids' digital platforms, reaching 11.1 million users monthly. Furthermore, the inclusion of *Mashopolis* programming within PBS Kids would ensure future placement on OTT (over-the-top) and SVOD (streaming video-on-demand) services, as well as freely accessed platforms like YouTube, as determined by PBS. As with the television series, TPT will aim to distribute *Mashopolis*' interactive games and apps on a project website featured on pbskids.org. Like other PBS Kids programming (including TPT's *Hero Elementary*), apps created for *Mashopolis* will be distributed through both Apple and Android app stores.

If PBS Kids unexpectedly declines to support/feature an RTL-funded *Mashopolis* project, TPT will implement a dissemination strategy with American Public Television (APT), a leading distributor of innovative, high-quality and top-rated programming to the nation's public television stations. To highlight its placement on APT, TPT would employ its deep experience in launching new children's series and its excellent relationships with public television programmers nationwide to implement an aggressive station relations/carriage campaign, ensuring the widest possible dissemination of all media. This campaign would begin six to nine months prior to premiere, and would feature regular communication with stations' programmers and marketers, as well as a presence at all APT program conferences. TPT has successfully employed similar carriage and/or awareness-raising campaigns for multiple national programs, including *SciGirls*, which enjoys over 90% coverage, including 100% of the top ten largest public television markets.

APT's exclusive broadcast window on public television is limited, opening up distribution opportunities across other platforms, including OTT, SVOD and multiple digital platforms. Contracting with such entities, which is an intentional and strategic process, clearly cannot be

performed on a provisional basis and/or as an alternative to PBS Kids inclusion. As such, fostering relationships with OTT and SVOD outlets would begin upon award announcement and subsequent decisions about PBS Kids inclusion. This is also true for digital games and apps; if a destination website is not featured on pbskids.org, TPT's digital team will build it as a freestanding website, and will foster relationships with popular gaming and/or educational platforms content (e.g. Apple App Store, Google Play, the Amazon App store and itch.io) to embed digital content.

Educational Outreach: The flexible, scalable design of the *Mashopolis* educational outreach initiative allows for both organic and opportunistic growth and evolution. TPT will empower its advisors and outreach partner organizations to broadly disseminate *Mashopolis*' educational resources across their existing networks, reaching thousands of children, families and educators nationwide. All resources will be featured on PBS Learning Media, which engages 1.8 million educators annually. Additionally, building upon *Hero Elementary* outreach programming, TPT will take advantage of opportunities to add cohorts in years after the RTL grant is finished, using its existing national network of certified outreach trainers. TPT will continue to raise money for these efforts through public, foundation, and corporate sources. The station has a rich history of leveraging an existing program into a new and/or extended initiative, as is evidenced by *SciGirls*' consistent growth, which has been supported by over \$40 million of funding from diverse organizations, including the NSF, NASA, the National Institutes of Health, the Center for the Advancement of Science in Space, and corporations like Cargill, Northrop Grumman, Exxon Mobile, L'Oreal, PPG and more. Additionally, TPT found that many *SciGirls CONNECT* Network partners successfully raised funds to foster ongoing training and programming.

Marketing and Promotions: If the proposed *Mashopolis* project is selected, TPT will replicate

the successful three-pronged promotional approach currently being employed for *Hero Elementary*, which includes:

- *Partnering with PBS:* TPT will collaborate with colleagues from PBS Promotions and Marketing to attract a broad audience to the television series and digital resources. Additionally, PBS will retain a third-party promotional firm to engage not only television/media reporters, but also those who cover gaming, online/distance learning, education, disabilities, children and family issues and more. This campaign will begin six months prior to the series premiere, and run throughout the 40-episode broadcast.
- *Retaining a digital marketing firm:* TPT will work with an additional team to leverage *Mashopolis* via the vast reach of social media. For the *Hero Elementary* campaign, TPT's efforts with the Salmon Borre Group included developing *Hero Elementary's* Instagram and Facebook to be valuable resources for parents; recruiting paid and earned diverse influencers to share messaging with their followers through Instagram, TikTok, YouTube, Facebook and Blogs; holding virtual screenings/watch parties, and launching a Family Science App Camp that employed the project's digital tools. It is important to note that the Salmon Borre Group's promotional initiatives were developed during the pandemic shutdown, so were tailored to make especially robust use of innovative virtual connections. TPT anticipates incorporating many of the same impactful tactics for *Mashopolis*, beginning six months prior to the series premiere and running through broadcast.
- *Empowering PBS stations around promotions:* TPT will issue an RFP to offer ten PBS Stations support in raising awareness around *Mashopolis* while providing community-based educational programming. Stations nationwide will be invited to partner with a

local library, museum, community center, public housing organization, or any other institution where families gather to learn and connect. Stipends of up to \$5,000 will cover materials, marketing, and planning needs. Events might include family nights (*Mashopolis Mondays!*), mini-camps, overnights, and screenings. TPT will provide recipients with an events toolkit with strategies for planning and implementation of successful events.

Professional Dissemination: TPT has identified professional conferences that will initially support the team's dissemination efforts and then provide opportunities for sharing project resources and findings. In Years One and Two, team members will attend children's media conferences (such as Sandbox Summit, GDC, Connected Learning and Kidscreen Summit/iKids, National Association for the Education of Homeless Children and Youth) to stay abreast of trends and opportunities in children's media. In Year Three, staff will share information about the project at education-focused conferences held by diverse groups such as the ALA, BGCA and the Afterschool Alliance, and those devoted to issues that affect our target audience, including educational equity and intergenerational learning. In years Four and Five, when the project is more fully implemented, staff will conduct presentations at local and national meetings dedicated to children's educational research (e.g. Society for Research on Child Development, American Educational Research Association), and will attend national conferences held by the library, afterschool education, children's media and educational technology communities (e.g. CRESST and Connected Learning c). As is evidenced by the recent orders around sheltering-in-place, all of these presentations do not have to be in person. Since March 2020, TPT has presented research findings at virtual conferences such as the STEM For All Video Showcase, and has held breakout sessions at multiple virtual conferences to train colleagues and raise

awareness around *Hero Elementary*, *SciGirls* and its *CEREBROedu* project, an NIH-funded effort that empowers Latinx youth, families and educators around neuroscience learning and career paths. Because virtual participation requires no travel funding, it has provided TPT with unexpected and fruitful opportunities for low- or no-cost professional dissemination. Finally, TPT will collaborate with partners, advisors, and consultants to support broad dissemination of project resources to their own networks, and will pursue opportunities to share research findings in collaboration with Rockman et al. (see Project Evaluation for details).

Achieving Objectives On Time and On Budget

TPT has over two decades of experience successfully managing large, federally-funded grants from diverse sources such as the US DOE, NSF, NEH, NIH, NASA and NEA, and has undergone multiple federal audits with no significant findings. TPT has a mature and tested financial management system and structure, and a staff compliance officer who receives regular training and updates to stay current with changing federal grant regulations and guidelines. The TPT team is familiar with the complexities of mingling federal and non-federal funding sources in the same project, and maintains an on-staff grants analyst who is responsible for financial reporting and draw-downs, as well as managing TPT's grants database that tracks awards, deliverables, reporting and completion deadlines, and archives all grant-related documents. TPT's attorneys have drafted hundreds of grant-compliant agreements, including dozens for very large (\$1 million plus) sub-awards under federal grants. TPT has documented sub-award management procedures, and will train relevant project staff in these practices.

As evidenced by decades of successfully launching national productions, including its latest *Hero Elementary* project, TPT has extensive experience managing the large-scale implementation of multi-year, multimedia projects. The Project Timeline in Table 1 identifies the

timing of project deliverables and team responsibilities.

	Development/Activity	Year 1	Year 2	Year 3	Year 4	Year 5
Television	Show bible	X				
	Animation		X	X	X	X
	Interstitial		X	X	X	
	Show packaged			X	X	X
Digital	Digital games	X	X	X	X	X
	Analog games	X	X	X	X	X
	Family app		X	X		
	Game Analytics		X	X	X	X
Outreach	Recruitment	X	X	X	X	
	Training		X	X	X	X
	MCP		X	X	X	X
	MFP			X	X	X
	Program dissemination			X	X	X
	Marketing campaign			X	X	X
Research*	Needs assessment	X				
	Formative studies	X	X	X	X	X
	Case studies			X	X	X
	Summative studies				X	X
*See Project Evaluation for detailed research timeline						

Team Member Roles and Qualifications

TPT has assembled a stellar project team with a long history of crafting award-winning media, educational resource creation, outreach implementation and research, including:

Core Project Team

Momo Hayakawa, Ph.D., PI and Project Director: **Momo** will manage the project timeline and budget, lead research and oversee the educational and creative approach. She currently serves as TPT’s research lead for *Hero Elementary*, overseeing formative and summative studies. Prior to TPT, **Momo** was a program manager and researcher for a Pre-K-3 educational intervention program funded by the US DOE’s i3 grant, where she studied and implemented developmentally-aligned educational programs for children, with a focus on family engagement.

Dennis Ramirez, Ph.D., Co-PI and Lead Digital Producer: **Dennis** is an award-winning game designer and researcher who creates engaging and impactful learning experiences through games. **Dennis** will craft *Mashopolis*' digital strategy and oversee resource production, which aligns with his current role on the *Hero Elementary* project. Prior to TPT, **Dennis** was the Technical Director of USC's Interactive Media and Game Design program, where he supported student projects and maintained the infrastructure needed to run the consistently top ranked game design program. His research includes educational game player data analysis, and he has developed games sponsored by the US DOE, NIH, NSF and the DOD.

Kristin Pederson, MA, Co-PI and Project Development Lead: **Kristin** will integrate *Mashopolis* into TPT's suite of educational programming and manage fundraising efforts for aligned programming. **Kristin** joined TPT in 2001 to lead educational outreach and public relations for *DragonflyTV*. Since then, her various roles within TPT have focused on developing outreach and raising funds for projects emphasizing science, health, history, gender equity and cultural responsiveness. As Senior Director of STEM Media and Education, she has contributed to and/or led projects supported by the NSF, NEH, NEA, CPB, NIH and NASA, and currently serves as PI or Co-PI on seven federally funded projects.

Carol-Lynn Parente, Executive Producer: **Carol-Lynn** will manage *Mashopolis* television production and lead project-wide creative work. Currently the Executive Producer of *Hero Elementary*, **Carol-Lynn** is an accomplished producer of children's media, winning 18 Emmy® Awards and seven Producers Guild Awards for her work on *Sesame Street*. As *Sesame Street*'s Executive Producer for 12 years and SVP of Creative for six years, she was responsible for the development and production of the series' content across all media platforms globally, including broadcast, digital, interactive gaming, web, apps, themed entertainment, outreach and

social media. **Carol-Lynn** is also the founder of Street Cred Media, specializing in the creation of engaging, entertaining and educational children's media.

Beth Daniels, Content and Education Manager: **Beth**, who currently serves in the same capacity within the *Hero Elementary* project, will create *Mashopolis*' curricular framework and educational content, guiding content and pedagogy across media platforms.

Beth has designed/developed award-winning digital educational content, including *Oregon Trail II*, *Big Science Ideas: Systems and Reading Explorations*. She has developed curriculum, taught grades K-8 in Minneapolis, and coached community-based afterschool programs. She frequently presents on youth program quality, experiential and project-based learning, Universal Design for Learning (UDL), science-literacy-technology integration, and overcoming systemic barriers to academic achievement.

Emily Jensen, Outreach Manager: **Emily** will manage the national outreach implementation, including designing the educational outreach strategy, recruiting and managing partners, and developing professional development. She currently serves in the same role with *Hero Elementary*. Prior to TPT, **Emily** worked with governments in Mexico, United Arab Emirates and Colombia, creating teacher professional development and education programs for children ages 5-11. **Emily** is a Fulbright Scholar whose research focused on access to education for minority children in post-Soviet nations, and has worked for over 12 years in community engagement, leading initiatives at the Minnesota State Senate and the Minnesota House of Representatives.

Lisa Richards, Coordinating Producer: **Lisa** will manage *Mashopolis*' production timeline and project-wide budget. Currently *Hero Elementary*'s Coordinating Producer, **Lisa** has 23 years of experience in television and multimedia production. Her previous television

production credits include *Super Soul Sunday*, for which she won two Emmy® Awards, *Oprah's Master Class* and *The Oprah Winfrey Show*. **Lisa** has worked extensively in national reality programming, digital/online series, and various TV show pilots, collectively managing productions on over twelve hundred hours of national television programming.

Melissa Wright, Executive in Charge: As TPT's General Counsel and Senior Vice President, **Melissa** will negotiate and structure business transactions with project partners and guide the project within TPT and across the public media system. **Melissa** currently serves in this same role for *Hero Elementary*.

Project Consultants

Jennifer Curry, Ph.D. Professor, Louisiana State University: **Dr. Curry's** research focuses on career and college readiness across the developmental spectrum. She is the author of the textbook *P-12 Career Counseling in Schools*, and her expertise lies in using innovative teaching strategies to promote career readiness skills, particularly among young learners.

Alexis Lauricella, Ph.D., Associate Professor and Director of the Technology in Early Childhood Center, Erikson Institute: **Dr. Lauricella's** research focuses on children's learning from media technology and parents' and teachers' attitudes toward and use of media technology with young children.

Scot Osterweil Ph.D., Creative Director of the Education Arcade, MIT: **Dr. Osterweil** has designed award-winning games in both academic and commercial environments, focusing on what is authentically playful in challenging academic subjects.

David Gagnon, Ph.D., Director of Field Day, Wisconsin Center for Education Research: **Dr. Gagnon's** award-winning lab is focused on the intersection of situated and sociocultural learning theories with digital media, specifically video games, mobile technology and mixed

reality. Field Day also develops and supports the ARIS platform, an augmented reality game development tool, and Siftr, a mobile platform for designing citizen science projects.

Yuko Munakata, Ph.D., Professor, Faculty of the Center for Mind and Brain and

Director of the Cognition in Context Lab at the University of California, Davis: Dr. Munakata

studies executive function and variations in thinking observed across development and contexts.

National Advisory Board

The *Mashopolis* advisory board is a diverse group of experts who will bring to the project their experience, strategy and research around critical topics including executive function, child development, innovative television and media production, educational gaming, cultural responsiveness and equity, programming in informal learning spaces, educational technology assessment and analytics, and intergenerational/family learning. These experts will convene twice annually, once in person and once virtually, to provide direction and review progress and results to date. TPT will also seek the input of advisory board members, individually and in small groups, throughout the course of the project. Please see Appendix C for Letters of commitment.

- Kristen DiCerbo, Ph.D. Chief Learning Officer, Khan Academy
- Nancy Coddington, Director of Science Content, Services, & Programming, WSKG Public Media
- Armando Orduña, Ed.D., Director of Outreach Programs, Children’s Museum Houston
- Matthew Berland Ph.D., Associate Professor, Curriculum and Instruction, University of Wisconsin
- Ben Devane, Ph.D., Assistant Professor, Learning Sciences, University of Iowa
- Karen Mapp, Ed.D., Senior Lecturer on Education, Harvard Graduate School of Education
- Nichole Pinkard, Ph.D, Associate Professor, School of Education and Social Policy, Northwestern University
- Ofelia Garcia, Ph.D, Professor Emerita, The Graduate Center, City University of New York
- Verni Howard, Executive Director, Providence House.

Independent Evaluation

Rockman et al.: Rockman et al. (REA) is an independent evaluation, research, and consulting *Mashopolis* (w/t) © 2020 Twin Cities Public Television, Inc. Page 38 of 52

firm that specializes in the assessment of learning, usability, and engagement outcomes of educational media and technology for youth and adult audiences. For the past 30 years, REA has conducted rigorous, independent evaluations and research for leading organizations in formal and informal education to understand the outcomes of their educational products, programs, and initiatives aimed at closing the educational gap for underserved populations. Past clients include PBS and PBS KIDS, Sesame Workshop, Sylvan Learning, Microsoft, Google, Comcast, Boys and Girls Clubs of America, New Visions for Public Schools, and the Smithsonian Institution.

Jennifer Borland, M.A., Project Evaluation Director. Ms. Borland has over 20 years of experience managing and contributing to program, product, and process evaluations for some of the world's leading media producers, museums, game developers, and educational institutions, with grant funding from the U.S. DOE, the NSF, and the Institute of Museum and Library Services. She has guided the overall design, analysis, and reporting on REA's PBS RTL, PBS KIDS Raising Readers, and PBS KIDS GO! formative evaluation studies, among others. Ms. Borland's areas of expertise are broadcast and digital media playtesting/usability testing, evaluating the impacts of informal programs, products, and exhibits, mixed-methods formal education program evaluation, technology-enhanced evaluative methods and sketchnoting, and participatory evaluation.

Project Partners

Oasis Animation, an internationally recognized studio specializing in 2D animated television production, will work collaboratively with TPT to develop the *Mashopolis* series' overall concept, structure, and production plan, and will produce all animated segments. Founded in 2003 by Jacques Bilodeau, Oasis Animation is based in Montreal and is one of the largest 2D animation production studios in Canada. Oasis Animation offers animation services to local and

international broadcasters and producers. As such, the company has participated in the production of prestigious animation series such as *Arthur* Seasons 13 & 14, 20 & 21, 22-25 (WGBH/PBS), *Curious George* Seasons 12-13 and 14-15" (NBC/Universal), *Martha Speaks* Seasons 5 & 6 (WGBH/PBS), *F is For Family* Seasons 3 and 4 (Gaumont/Netflix), *Kulipari* (Splash/Netflix), *Caillou* (Cookie Jar/PBS), *Lucky Fred* (RAI, Disney), *6Teen* (Télétoon), *Walter* (Société Radio-Canada), and *On s'écoute Parler, François Pérusse* (TVA).

Hot Spaghetti Productions is a creative development and production company specializing in educational children's media. With over 30 years of experience, this Emmy Award-winning team specializes in rich, comedic storytelling that engages kids using the latest trends in education and technology. Hot Spaghetti has created, written and produced projects for PBS, Sesame Street, HBO, Nick Jr., Noggin, BBC, Sprout and YouTube, and has contributed the *Mashopolis* IP to the proposed project.

Filament Games is an award-winning educational video game studio that provides design and development for clients all over the world. The group's prime directive is to create inspiring educational experiences that spark imagination and foster deep learning through exploration and discovery. Filament's success lies in a development process that tightly integrates commercial game techniques with best practices from curriculum design and the learning sciences. Over the past 15 years, the firm has developed over 160 game projects for clients such as Twin Cities Public Television, National Geographic, McGraw-Hill, Amazon, and Scholastic. Filament games have had over 100 million plays and are available on devices such as browsers, tablets, phones, and XR devices. Its headquarters are located in Madison, Wisconsin.

Two Moos collaborates with the most respected family brands and non-profit foundations in the world, including TPT, PBS KIDS, WGBH, Sesame Workshop, New York Hall of Science,

The Allannah and Madeline Foundation and Scouts Australia. Two Moos has had many years of experience working on digital products for RTL funded projects with PBS KIDS and its affiliates. Projects include TPT's *Hero Elementary*, Thirteen's *Cyberchase*, WGBH's *Arthur* and PBS KIDS' *Elinor Wonders Why*, *Ready Jet Go!*, *Super Why!* and *Cat in the Hat Knows A Lot About That*.

D. PROJECT EVALUATION

Rockman et al. (REA), an independent research and evaluation company, will serve as Twin Cities Public Television's research and evaluation partner and will lead a research consortium comprised of complementary research organizations (TERC & The Garibay Group) with unique skills and knowledge to inform the proposed 2020-2025 RTL effort. In this lead role, REA will develop and implement a robust research and evaluation plan that informs the design and refinement of TPT's transmedia resources, and systematically investigates the impacts of these RTL-funded materials on young learners' development of foundational workforce-aligned executive functioning (EF) skills. REA is well-positioned to lead the project's research consortium, with over 25 years of experience conducting rigorous research and evaluation of media and educational technologies, including participating as an evaluation partner for PBS's 2010-2015 RTL initiative and conducting evaluations of TPT's *DragonflyTV* (see Appendix D for a detailed description of the research consortium's relevant experience and management structure). As members of the research consortium, TERC will bring expertise in family engagement and home studies, while The Garibay Group brings a community-focused approach and a diversity, equity, and inclusion lens.

To reduce potential biases, the research team within REA will be overseen by REA's Director of Research Programs, Jennifer Borland, and divided into two separate groups (one

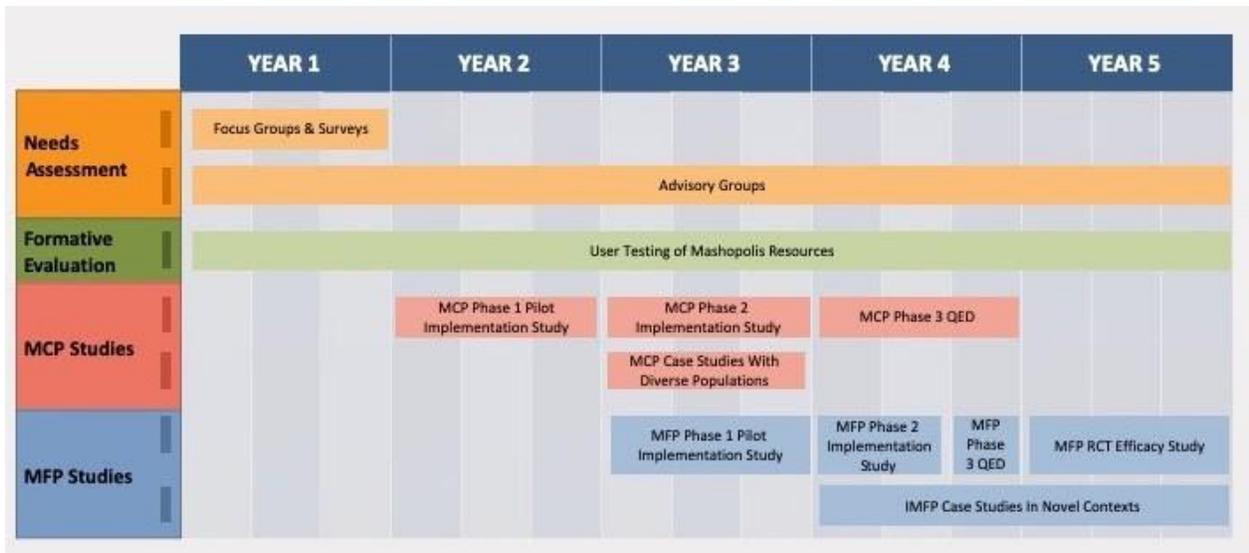
responsible for formative testing of digital and media resources led by Dr. Julia Li, and the other focused on the needs assessment and programmatic impacts led by Dr. Camellia Sanford-Dolly; See Figure 1 in Appendix D). In addition, REA will coordinate annual reviews of research approaches and findings by external experts to further ensure the integrity of the evaluation.

Guiding Research Questions: The following questions will guide this evaluation:

- **Research Question 1 (RQ1):** Do children participating in the Mashopolis Family Program (MFP) and the Mashopolis Children’s Program (MCP) demonstrate measurable increases in: a.) skills related to foundational workforce-aligned EF skills?, b.) self-efficacy around their developing EF skills?, and c.) interest in and exposure to pursuing activities that build their EF skills, and d.) knowledge of foundational skills that lead to diverse career options?
- **RQ2:** Do caregivers who participate in the MFP demonstrate measurable positive changes in: a.) their understanding of EF skills, b.) their valuing of EF skills as they relate to career and workforce readiness, and c) their self-efficacy and perceived capacity to support executive function-enhancing activities that build their children’s workforce readiness?
- **RQ3:** Do informal educators who participate in TPT’s professional development training feel prepared to implement the MCP and MFP, and subsequently demonstrate measurable positive changes in: a.) their understanding of EF skills, b.) their valuing of EF skills as they relate to careers and workforce readiness, and c) their self-efficacy and perceived capacity to support executive function-enhancing activities that build children’s workforce readiness? In addition, the research team will investigate the following exploratory questions:

- **Exploratory Question 1 (EQ1):** What approaches are effective and what adaptations are made to the MCP to fit the needs of various communities (e.g. children experiencing housing insecurity, English Language Learners)?
- **EQ2:** In what ways does intergenerational family engagement with the MFP moderate learner outcomes, and do the impacts of the program extend beyond the target child to other family members, such as siblings?
- **EQ3:** What approaches are effective and what adaptations are made to support the MFP's use within innovative learning spaces?
- **EQ4:** What individual, family, or community characteristics are associated with greater effectiveness of TPT's media-enhanced educational programming?

Evaluation Overview: REA will enact a multi-tiered, complementary set of formative and summative activities to address the project's guiding research and exploratory questions. These activities will include: 1) a needs assessment with families and informal educators, 2) formative evaluation of Mashopolis resources, 3) an implementation study of the MCP embedded within informal educational organizations (inclusive of a quasi-experimental study (QED) designed to meet What Works Clearinghouse (WWC) standards with reservations), 4) case studies of MCP implementation with diverse populations, 5) a home implementation study of the MFP with caregivers and their children (inclusive of a QED designed to meet WWC standards with reservations), 6) a case study of the MFP in novel everyday contexts, and 7) an efficacy study of the MFP (a randomized-control trial designed to meet WWC standards without reservations). See Appendix D for details on the study design, recruitment strategies, data analyses, and the dissemination plans. The timeline below illustrates the progression of research activities across the five years:



1) Needs Assessment with Families & Informal Educators REA will conduct a needs assessment with two main audiences: a.) Families with 5 to 8 year-old children from diverse backgrounds who live in low-income communities, and b) Informal educators (e.g. community center staff, librarians, etc.) who work with 5 to 8 year-old children in low-income communities. The needs assessment will help determine what families and informal educators already understand, value, and use with regards to educational media and other resources related to their children’s development of EF skills and foundational workforce readiness. Feedback from stakeholders representing end-user communities will support TPT’s development of relevant, accessible, and culturally responsive media-enhanced educational programming. The needs assessment will consist of nationwide surveys of families and informal educators, as well as community-based focus groups that recognize the value of incorporating geographically, culturally, and linguistically diverse stakeholder perspectives and experiences to address issues of equity and accessibility throughout the design process. Participants will be drawn from TPT’s existing and new partner organizations serving diverse low-income communities (see Letters of Commitment). In addition, two advisory groups will be identified from within these communities and will convene in-person or virtually multiple times per year, beginning in the needs *Mashopolis* (w/t)

assessment phase and continuing throughout the life of the project, to iterate on specific media elements. Using a participatory design-based approach (DiSalvo et al., 2017), members of these advisory groups will collaborate with developers and researchers to co-design media-enhanced educational programming that equitably serves their communities. **2) Formative Evaluation of Project Resources** REA will support the iterative development of TPT’s media-enhanced educational programming via several rounds of formative testing each year with families and informal educators representing diverse, low-income communities, incorporating quick turnaround feedback cycles that inform the subsequent design of project resources, as they become available. During this cyclical process, REA will conduct concept testing around the appeal of the overall premise, characters, content, and format to guide TPT’s overarching transmedia approach. REA will also examine the broadcast series’, digital resources’, and MFP and MCP activities’ appeal, usability, and potential for supporting the development of children’s EF skills via in-person or virtual playtesting sessions. Here, REA will utilize lessons learned from participation in previous Ready-to-Learn formative evaluation cycles and with Fred Rogers Productions on developing *Peg + Cat* resources to inform their overall approach. In addition, REA will solicit and aggregate expert reviews of project resources from content developers, scholars, and members of the research consortium to ensure that these materials are aligned with foundational workforce-aligned EF skills, culturally responsive, and adhere to best practices for fostering intergenerational family engagement. **3) Mashopolis Children’s Program (MCP) Implementation Studies** The purpose of the MCP implementation studies is threefold: 1.) to investigate the MCP’s impact on children’s foundational workforce-aligned EF skills (RQ1), 2.) to determine for whom the MCP is effective and under what conditions (EQ4), and 3.) to understand whether and how the professional development (PD) training impacts informal

educators (RQ3). REA will examine the fidelity of implementation of the MCP within informal educational organizations in three phases. In MCP Phase 1 (a pilot study of 6 organizations from MCP pilot cohort 1), REA will study how TPT iterates on the MCP and PD training. In MCP Phase 2 (a study of 8-10 additional organizations from MCP cohort 2), REA will study how organizations employ updated versions of the MCP materials (informed by MCP Phase 1 findings) and a train-the-trainer PD model. MCP Phase 3 will consist of a QED study with 400 children at approximately 27 sites. Approximately 200 children will experience the sites' typical educational enrichment programs, and approximately 200 children will be randomly selected to participate in the MCP in addition to the sites' typical educational enrichment programs. The sample size of 400 children is based on a power analysis assuming an average of 15 children per site, an alpha of .05, and children's pre-scores on EF skills assessments and site-level characteristics accounting for 50% of the variance. These parameters result in 80% power to detect a moderate effect size of about .197. Comparison sites and children will be offered the MCP after completion of the study.

Organizations recruited to participate in the implementation of the MCP studies serve diverse, low-income communities, and will be drawn from TPT's new and pre-established partnerships (see Letters of Commitment) for MCP Phases 1 & 2, and from the research consortium's existing networks in MCP Phase 3. Evaluation activities during the three phases include, but are not limited to: Instrument validation and cognitive interviews, pre-post assessments (see Table 2 for measures) and focus groups with participating children, online analytics from *Mashopolis* digital games using a dedicated website with research participant log-ins, observations of PD training sessions and MCP implementation, a post-survey with PD participants, interviews with PD trainers, interviews and pre-post surveys with informal

educators implementing the program, and follow-up surveys with informal educators one year after their initial implementation. **4) Mashopolis Children’s Program (MCP) Case Studies With Diverse Populations** To examine how the MCP might be adapted to meet different communities’ needs (EQ1), REA, in collaboration with The Garibay Group, will conduct two case studies of how 2-4 organizations from MCP cohort 2 implement and modify the MCP within the following populations: 1.) families experiencing housing instability and 2.) families with English Language Learners. Foci of these case studies will include an examination of different community-specific and culturally responsive supports that are developed, whether the method of communication, access points, pacing, format, or content of the MCP are modified, and whether these changes impact child or informal educator outcomes. Evaluation activities will mirror those of Phase 2 of the MCP implementation study, but may also evolve in response to community involvement and feedback. **5) Mashopolis Family Program (MFP)**

Implementation Studies The MFP implementation studies will address questions, such as 1) Does the MFP support desired child, caregiver, and informal educator outcomes (RQ1, RQ2, & RQ3)?, 2) For whom is the MFP effective and under what conditions (EQ4)?, and 3) What strategies are most effective for encouraging families to interact together around MFP (EQ2)? REA will examine the fidelity of implementation of the MFP in three phases. In MFP Phase 1 (a pilot study of 3 sites from MFP pilot cohort 1), REA will study how TPT iterates on the MFP. In MFP Phase 2 (a study with 3 organizations from MFP cohort 2), REA will study how organizations use updated versions of the MFP materials. MFP Phase 3 will consist of a QED with 300 families (approximately 150 families who receive a pre-loaded tablet with digital games and their site’s typical take-home resources and programming, and approximately 150 who are randomly selected to additionally receive the Mashopolis Family app and the MFP). The

sample size of 300 families is based on estimates of 25 families per site, an alpha of .05, and children's pre-scores on EF skills assessments and family and site-level characteristics accounting for 50% of the variance. These parameters result in 80% power to detect a moderate effect size of about .230. The MFP Phase 3 QED will allow the research team to test measures and methodologies in preparation for the MFP Efficacy study.

Organizations recruited to participate in the implementation of the MFP studies serve diverse, low-income communities, and will be drawn from TPT's new and pre-established partnerships (see Letters of Commitment) for MFP Phases 1 & 2, and from the research consortium's existing networks in MFP Phase 3. Evaluation activities during the three phases include, but are not limited to: Instrument validation and cognitive interviews, pre-post assessments (see Table 2 for measures) with participating children, in-home observations of family interactions around family program media and activities, families' media use logs, analytics via the Mashopolis Family App, caregiver pre-post surveys, and interviews. **6)**

Innovation Mashopolis Family Program (IMFP) Case Study To better understand how project resources might be adapted to support families in everyday settings outside of the home (EQ3), REA, in collaboration with TERC, will explore the use and impact of the IMFP in novel contexts where caregivers and their children congregate, such as farmer's markets, parks, and transportation hubs. Here, REA will examine how 2-4 community organizations utilize these incidental learning spaces to implement MFP resources. IMFP case study sites will be drawn from TPT's new and pre-established partnerships (see Letters of Commitment) that serve diverse, low-income communities. Evaluation activities include onsite observations, intercept interviews, and embedded assessments with children and their families. **7) Mashopolis Family Program (MFP) Efficacy Study** To assess the impact of the MFP on 5 to 8 year-old children's

development of foundational workforce-aligned EF skills (RQ1), as well as their caregiver's and informal educators' support of those skills (RQ2 & RQ3), REA will conduct a randomized control trial (RCT) with 600 low-income families at approximately 40 sites (MFP RCT cohort). Families will be randomly assigned to one of two conditions: 1.) Families who receive non-PBS educational digital games on a tablet and existing take-home materials from study sites (Control Condition, n=300), and 2.) families who, in addition, receive the *Mashopolis* Family app on a tablet and other MFP take-home resources (Treatment Condition, n=300).

Sampling: REA will recruit approximately 40 sites with 600 low-income families with at least one adult caregiver and one 5-8 year-old child who qualifies for free or reduced lunch to participate in the MFP RCT. Based on a power analysis assuming an alpha of .05, approximately 15 families per site, and children's pre-scores on EF skills assessments, and family-level and site-level characteristics accounting for 50% of the variance, these parameters result in 80% power to detect a moderate effect size of about .162. Families will be recruited via informal educational organizations, such as libraries, museums, and community centers, representing diverse communities within the research consortium's network of past project sites.

Measures: For each impact study (i.e. MCP QED, MFP QED, MFP RCT), the researchers will use validated measures of children's EF skills and may also adapt existing measures to ensure alignment between the targeted EF skills and the instrumentation. Instrumentation used will focus on three EF skills: cognitive flexibility, working memory, and inhibitory control.

Table 2. Child Outcome Measures for MCP QED, MFP QED & MFP RCT Studies		
Measures	Executive Function Skill	Method of Administration
Minnesota Executive Function Scale (MEFS)	Working memory, Cognitive flexibility, Inhibitory control	App-based
Shape Trail Test - child version (STT-CV)		Paper-based
Hearts & Flowers Task		Computer-based
Stroop Color and Word Test: Children's Version (SCWT-CV); Dimensional Change Card Sort (DCSS)	Cognitive flexibility	Paper-based
Day/Night (DN) Task	Inhibitory control	Paper-based
Flanker Test; Head-To-Toes (HTT) Task		Computer-based
NIH Toolbox List Sorting Working Memory Test	Working Memory	Computer-based
Children's Kitchen Task Assessment (CKTA)		Activity-based

Researchers will mainly utilize the Minnesota Executive Function Scale App (MEFS AppTM), developed by Reflection Sciences (www.reflectionsciences.com), as an age-appropriate metric to assess children's executive function skill level (Carlson & Zelazo, 2014; Carlson, 2017). The app features an adaptive virtual card-sorting task that takes 4 minutes, on average, to complete and is delivered on a tablet computer. Additional measures that will be tested to determine best fit for use in the home study portions of the MFP QED and MFP RCT can be found in Table 2. REA will also utilize the Behavior Rating Inventory of Executive Function (BRIEF; Gioia et al., 2002) and Childhood Executive Functioning Inventory (CHEXI; Thorell & Nyberg, 2008), which survey caregivers and educators on children's EF skills.

Procedure: Researchers will randomly assign families to one of the two conditions. Families in both conditions will visit their community site to complete pre-study activities (children will take pre-assessments of their EF skills, while caregivers fill out a pre-survey and receive study instructions). Families in the Control condition will receive a pre-loaded tablet and other take-home materials, while Treatment families will also receive the *Mashopolis* Family app and MFP resources at this time. At a later date, families in the Treatment condition will attend an educator-led kickoff event at their community site to learn more about the MFP. To support **fidelity of**

implementation, families in both conditions will be expected to utilize the provided resources at least 20 minutes per day for 6 weeks, with a suggested sequence for Treatment families.

Caregivers in both conditions will be asked to keep media use logs to track their child and family's usage (Anderson et al., 1985), which will be supplemented via online analytics of the *Mashopolis* Family App (Tlili & Chang, 2019).

Families in both conditions will return to their community site to complete post-study activities. As before, children will participate in post-assessments of their EF skills and a post-interview, while the caregiver completes a post-survey and post-interview, and submits their media use log. All participating families will get to keep the tablets after analytics are downloaded, and researchers will update the tablets of families in the Control condition to include the *Mashopolis* Family app and additional MFP materials.

A subset of families (25 per condition) will be asked to participate in an in-depth home study that includes pre-post embedded task-based assessments of children's EF skills, an individual pre-post caregiver interview, observations of the family's media use, and a post-joint caregiver-child interview. Families selected for the home study will complete all pre- and post-study activities that would have taken place at their community center, at home.

Analysis: The outcome analyses (detailed in Appendix D) that address RQ1-RQ3 will be estimated with two-level hierarchical linear models to account for clustering of participants within sites. Least-squares regression analysis will be used to examine the extent to which individual, family, and community characteristics impact child outcomes (EQ3). Qualitative data will be analyzed using a grounded theory approach to identify emergent themes via Dedoose coding software (Charmaz, 2006).

Dissemination: REA will collaborate with TPT, the research consortium, and project advisors to leverage existing public media, informal learning, and child development research organizational networks to amplify lessons learned from the project’s study design and findings. Venues for this work include webinars, conference presentations at convenings (e.g., the American Educational Research Association, National Afterschool Association, Afterschool Alliance) and research articles in journals (e.g., Learning Media and Technology, Journal of Children and Media). In addition, the research consortium will develop briefs summarizing research methods and findings to share with project stakeholders. These materials will be distributed digitally or in print to project partners, via blogs on REA’s, TERC’s, The Garibay Group’s, or TPT’s websites, or through suggested social media posts (e.g., Twitter, LinkedIn, Facebook, Medium).