EDUCATION

THE UTAH STATE BOARD OF EDUCATION

Report to the Education Interim Committee

Utah Preparing Students Today for a Rewarding Tomorrow (UPSTART) Report

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Kerong Wu
Research Consultant, USBE
kerong.wu@schools.utah.gov

Quinn Kellis
Educational Coordinator, USBE
quinn.kellis@schools.utah.gov

Jennifer Throndsen
Educational Director, USBE
jennifer.throndsen@schools.utah.gov

Darin Nielsen
Associate Superintendent, USBE
darin.nielsen@schools.utah.gov

STATUTORY REQUIREMENT

U.C.A. Section 53F-4-407 requires the Utah State Board of Education (USBE) to submit a report on UPSTART to the Education Interim Committee annually on or before November 30. The State Board is required to contract with an independent evaluator to evaluate the program. Reporting on the program shall include the (i) number of families participating in the program including the number of families requesting and furnished computers; (ii) number of private and public preschool providers participating in the program; (iii) frequency of software usage; (iv) obstacles encountered with software usage, hardware, or providing technical assistance to families; (v) student performance on assessments as detailed in statute; and (vi) any other information that is part of the independent evaluation.

Utah Preparing Students Today for a Rewarding Tomorrow (UPSTART) Report

EXECUTIVE SUMMARY

During the 2021-2022 school year, Cohort 13 participated in the Utah Preparing Students Today for a Rewarding Tomorrow (UPSTART) program. The UPSTART program, administered by the Waterford Institute, uses a home-based educational technology approach to develop the school readiness of preschool children.

Waterford reported that (i) 17,026 students volunteered to enroll in the Year 13 PreK program. Of these, 1,932 families requested and were furnished with computers and (ii) 11 private and 2 public preschool providers participated in the program.

Individual student data files submitted by Waterford showed a total of 13,857 preschool participants who had usage records in Year 13 of the program. Of these, 28% were in households below 185% of the Federal Poverty Level, and 11% were family income information not known.

Of the total participants who had usage records, 13,404 enrolled in the Fall of 2021 and were evaluated by the Evaluation and Training Institute (ETI). Students in Cohort 13 used the UPSTART program for an average of 36 hours during the program year. Students who were UPSTART graduates used the program for an average of 45 hours.

The independent evaluation for Cohort 13 of the program is attached.

RESEARCH REPORT

EVALUATION AND TRAINING INSTITUTE
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AN EVALUATION AND TRAINING INSTITUTE REPORT

UPSTART Program Evaluation

YEAR 13 PROGRAM RESULTS

October 31, 2022

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100 Corporate Pointe, Suite 387, Culver City, California 90230 || 310-473-8367

ACKNOWLEDGEMENTS

The Evaluation and Training Institute (ETI) thanks Melanie Durfee, PhD (Specialist, Digital Teaching and Learning) and Kerong Wu, Ph.D. (Research Consultant, Technology-supported Learning) from the Utah State Board of Education (USBE) for their ongoing collaboration throughout this evaluation project. We appreciate their efforts in sharing state PEEP and KEEP data with us in order to conduct our analysis.

Additionally, we extend our thanks to Claudia Miner, PhD and Haya Shamir, PhD from Waterford for continuing to provide ETI with the necessary UPSTART data used to complete the evaluation each program year.

ABOUT EVALUATION AND TRAINING INSTITUTE

Founded in 1974, the Evaluation & Training Institute (ETI) is a non-profit consulting firm, headquartered in Los Angeles, dedicated to working with schools, post-secondary institutions, public agencies, private foundations, community-based organizations, and professional organizations. We specialize in third-party program evaluations covering many fields, including education, literacy, STEM, social services, health, and prevention. Many of our evaluations have been instrumental in the development of public policy as well as state and federal legislation. Throughout, our focus is on helping clients improve their programs as well as maintain accountability to funders and oversight committees.

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EXECUTIVE SUMMARY

The Evaluation and Training Institute (ETI), has prepared this report for the Utah State Board of Education (USBE) to study the UPSTART program in its thirteenth year of implementation; Cohort 13 students were enrolled during the 2021-2022 program year. This year's evaluation includes the results for both program implementation and program outcomes, as well as results from the kindergarten program analysis (Cohort 12 students finished kindergarten in 2022).

Waterford enrolled 13,404 preschoolers in the 2021-22 program year, down from the previous year's enrollment of 16,770. This year's cohort of children also marks the third year of implementing and examining three different tiers of program support for families: Tier 1, UPSTART software only; Tier 2, UPSTART with digital communication for parents to receive text-message program support; Tier 3, UPSTART with full implementation support. We examined usage as well as student outcome differences by parent support tier assignment.

A summary of Year 13's main findings are below:

- Seventy-three percent of UPSTART students graduated from the program during the 2021-2022 program year.
- All students (regardless of graduation status) used the UPSTART program for an average of 36 hours during the program year; students who graduated from the program had approximately 45 hours of average use. Logging regular and consistent time with the program was important to meeting the time-centered goals, however measuring the quality of that 'seat time' was less straightforward.
- The Year 13 evaluation found that over 90% of the UPSTART sample achieved proficiency in literacy and numeracy by the end of the program, as measured by Utah's Preschool Entry and Exit Profile (PEEP) assessment.
- An analysis of UPSTART children classified as "needing support" in literacy or numeracy at the beginning of preschool, found that a notable proportion of those children increased their proficiency level to "sufficient prerequisite knowledge" by the end of preschool (i.e., demonstrating the expected early skills for kindergarten entry).
- Participation in Tier 3, the most comprehensive level of parental support, yielded higher program usage compared to families opting for Tier 1 (no parental support).
- Children who did not graduate from UPSTART were more likely to have parents with lower levels of education, be members of an underrepresented racial or minority group and have parents who were not married compared to children who graduated from the program.
- The majority of Year 12 kindergarten students, who participated in UPSTART during their preschool year (2020-2021), started and ended their kindergarten year at Level 3 proficiency or as defined by the USBE, "demonstrated sufficient knowledge and skills and may require minimal intervention to succeed."

Recommendations

We recommend continuing the UPSTART program based on its association with students' early skill development. It is important for the program to address the risk factors that contribute to lower graduation rates and a lack of consistency in use among the most vulnerable populations of children. While the *total time* spent with the program is one of the main criteria set for graduation status, encouraging consistent and high-quality *weekly* use may help create productive program engagement so that all children get the most out of their 'seat time.'

More information is needed to fully understand the parental support tiers and whether families differ based on the tier they select. We found that full implementation support with the additional communication structure and program resources (Tier 3) appeared to influence usage and result in more consistently engaged children. In general, we found a greater proportion of children in Tier 3 achieving proficient levels in literacy at the end of the year, compared to those in Tier 1. We recommend additional areas of inquiry in future evaluations in order to identify the drivers of outcome differences and motivations for support tier selection.

INTRODUCTION

Evaluation Purpose

The Utah State Board of Education (USBE) hired the Evaluation and Training Institute (ETI), a non-profit research and consulting firm, to conduct a multi-year evaluation of the UPSTART program. The current evaluation is part of a five-year contract (2019-2024), representing Year 11 to Year 15 of the UPSTART program in the state of Utah. Each year comprises a new cohort of preschool children entering into the program. Year 13 students (Cohort 13, or C13) participated in the UPSTART program from 2021-2022. The current report focused on the preschool results of Cohort 13 and additionally included a kindergarten analysis of Cohort 12 students who previously participated in UPSTART and completed their kinder year in 2022.

The overarching goal of the evaluation is to help the state and stakeholders determine the benefits from participating in the program. ETI studied two core aspects of UPSTART, 1) children's use of the program during the program year (implementation), and 2) an analysis of educational achievement outcomes at the beginning-of-year (BOY) and also the end-of-year (EOY) among program participants. This year's cohort of children also marked the third year of implementing and examining three different tiers of program support for families: Tier 1, UPSTART software only; Tier 2, UPSTART with digital communication for parents to receive text-message program support; Tier 3, UPSTART with full implementation support.

Report Roadmap

The sections of this report are organized in the following way, (1) an overview of the objectives, program description and evaluation methodology, (2) program implementation including enrollment, usage, and graduation results across the total program population and by support tiers, (3) program analysis and results across UPSTART students as well as support tiers, (4) kindergarten analysis and results for Cohort 12 students, and (5) summary and recommendations from the 2021-2022 program year.

Evaluation Objectives

The primary focus of the evaluation was children's literacy development, however, an analysis of students' numeracy outcomes was also included. UPSTART provides curriculum for numeracy learning, and the state's preschool and kindergarten assessments were designed to measure literacy and numeracy. We found it valuable to provide information for both of these domains, as the definition of kindergarten readiness includes both learning domains.

The **C13 preschool evaluation** had several main objectives:

- Document the extent to which participants used the computerized curriculum as it was intended

- Examine the early literacy skills (primarily) and numeracy skills (secondarily) among those participating in the UPSTART program at the beginning and end of the preschool year
- Explore the relationship between the support tier selected, curriculum usage and kinder readiness

The **C12 kindergarten evaluation** had one main objective:

- Examine the early literacy and numeracy skills before and after kindergarten for a sample of students who participated in the UPSTART program during their preschool year

UPSTART Program Description

Waterford recognizes that nearly half of our country's 4-years-olds face socioeconomic barriers that keep them from early education. *Utah Preparing Students Today for a Rewarding Tomorrow* (UPSTART) is a home-based computer school readiness program developed and provided by Waterford to prepare young children for school entry and future academic success. The program offers in-home, early education access to unserved and often lower income families by providing support, technology, and internet where needed. Waterford enrolled 13,404[1] preschool children during the 2021-2022 school year, its thirteenth year of operation. Families were provided with an adaptive program of computer-based early math and literacy instruction to prepare them academically for kindergarten. The 13,404 children enrolled in C13, participated in UPSTART from September 2021 through mid-May 2022.

The UPSTART software used adaptive lessons, digital books, animated songs, and activities to deliver individualized early literacy content. Once children met the required literacy usage, they were able to additionally engage in the math/science curriculum. Waterford reported in their 2021-2022 annual results that approximately 8 in 10 Utah preschool students also spent time with UPSTART math/science. The skills taught by the UPSTART program are outlined in **Table 1**.

[1] For the current evaluation, the 2021-2022 enrollment totals are based on children who enrolled in the UPSTART program in Fall of 2021 and spent at least some time with the program. It was important for our analyses that children had the opportunity to use the program for the typical academic year (August – May).

Table 1. UPSTART Reading and Math Curriculum

Early Reading Curriculum	Early Math and Science Curriculum
Phonological Awareness	Numbers and Operations
Phonics	Measurement and Data
Comprehension and Vocabulary	Geometry
Language Concepts	Science Concepts

Children were encouraged to use the UPSTART program for a minimum of 1500 minutes across the life of the program (or 15 minutes a day, 5 days a week). Depending on tier selection, families were provided with parental resources and technical support from Waterford customer service representatives.

COHORT 13 METHODOLOGY

The following section presents a summary of the research methods used in the Cohort 13 evaluation including the design, guiding research questions, our data collection procedures, sample definitions and the measures used to conduct the analysis.

Research Design

ETI conducted a pretest/posttest treatment group only design following the USBE's recommended approach to the Year 13 evaluation. We collected pretest and posttest assessment data measuring early literacy and numeracy skills from a sample of children enrolled in the UPSTART program. The pretest assessments were conducted prior to the start of the preschool year (2021) and posttest assessments were conducted at the end of the preschool year (2022). The following timeline shows the single group design used to study program outcomes on emerging literacy and numeracy skills.

	Summer 2021		**Summer 2022**	
Registered UPSTART Students	Pre-Test	**UPSTART**	Post-Test	Kindergarten

Research Questions

The Utah State Board of Education (USBE) was interested in outcomes related to the implementation of UPSTART, descriptive data, and proficiency levels of the students participating in the program both before and after the program year. Several research questions

guided the current evaluation to determine the extent to which preschool children used the program as it was intended, how UPSTART students scored on measures of kindergarten readiness, and how (if at all) the different levels of parental program support (tier assignment) affected usage and early achievement outcomes.

Our research questions for the C13 evaluation were as follows:

Cohort 13 Implementation Study
Research Question 1.1: To what extent did children use the UPSTART program as defined by Waterford (measured in minutes of instruction per week/total minutes for duration of program)?

Research Question 1.2: What proportion of the participants successfully met the requirement for program completion (i.e., "graduated" as defined by Waterford)?

Research Question 1.3: Do different levels of parental program support (tiers) influence program usage?

Cohort 13 Preschool Outcome Study
Research Question 2.1: What proportion of UPSTART students achieved Level 3 ("proficient") for kindergarten readiness at the completion of the program year?

Research Question 2.2: Did UPSTART students with different levels of parental program support (tiers) show differences in early achievement outcomes?

Research Question 2.3: What proportion of UPSTART students classified at the start of preschool as "needing support" in literacy or numeracy skill development, were classified as "proficient" in those skills by the end of the program?

Procedure

Implementation Study. To evaluate the implementation of the UPSTART program, data were obtained from records shared by Waterford for all children who had enrolled in the 2021-2022 program year. The records provided data across all usage variables including average weekly use, average number of days per week, average session duration, and overall average total time with the program. Waterford provided program graduation data indicating whether or not the child successfully met the graduation requirements of the program. Data included information about the type of equipment provided to the family by UPSTART as well as the tier-level of support selected. Parents additionally provided demographic information about the child and household through the program registration process. These datasets were analyzed by ETI to generate the findings related to program implementation, usage, graduation rates and support tier descriptives.

Preschool Outcome Study. To evaluate the kindergarten readiness of UPSTART students, we studied the test performance for children enrolled in the program for Year 13. Pretest and posttest data were collected, including early literacy and numeracy skill assessments. Prior to any child testing, parents of UPSTART children provided informed consent for the testing procedures and also provided demographic information via an online survey. ETI collected all assessment data through one-on-one virtual test administration with a trained test administrator. The tests were conducted at the beginning and end of the preschool year and all children were assessed with the same state-mandated assessment tool that included several literacy and numeracy scales. The entire assessment procedure was completed in 30-40 minutes on average with identical procedures for each UPSTART child.

Measures

Preschool Study. The outcomes of interest for the UPSTART evaluation were primarily basic literacy skills such as phonological awareness, letter knowledge, and vocabulary. Secondarily, we examined numeracy abilities such as numeral recognition and quantity discrimination. We used *Utah's Pre-Kindergarten Entry and Exit Profile (PEEP)* to measure the outcomes among our treatment group. This assessment was recently designed and created by Utah educators, higher education faculty members, and members of the USBE.

Utah's PEEP is intended to inform various stakeholders, such as parents, teachers, and leadership, on the academic and lifelong learning practices essential for entering and exiting preschool students. The assessment is designed to provide the following information:

- Current levels of performance upon entry and exit of preschool
- Identify students who may need early intervention instruction and promote differentiated instruction for all students
- Analyze the effectiveness of programs
- Provide opportunities for data-informed decision-making and cost-benefit analysis of early learning initiatives
- Identify effective instructional practices or strategies for improving student achievement outcomes in a targeted manner
- Understand the influence and impact of preschool in both the short- and long-term[2]

We were most interested in identifying performance levels, determining program effectiveness, and understanding the influence of a preschool intervention for the purposes of this evaluation. PEEP exit subscales measured literacy constructs such as *vocabulary* and *letter knowledge*, while the numeracy constructs included skills such as *counting* and *numeral discrimination*. The PEEP

[2] Information cited from the PEEP administration manual.

exit consists of two subscales and produces a total score for literacy and a total score for numeracy. All question areas are presented in **Table 2**.

Table 2. PEEP Exit Profile

Literacy (Score range 0-108)	Numeracy (Score range 0-36)
Oral language	Oral counting
Alphabet knowledge: uppercase	Numeral identification
Alphabet knowledge: lowercase	Number sense: 1-1 correspondence, cardinality and quality to numeral
Writing letters	Number sense: numeral to quantity
Phonological awareness	Discrimination: quantity
Alphabetic principle	Discrimination: shape creation
Concept of print: directionality	
Concept of print: letter and word	
PEEP Exit Profile updated August 2021	

The PEEP was also designed to categorize students' performance levels based on their overall literacy and numeracy scores. Students at PEEP entry (prior to starting preschool) are grouped into two levels, defined by USBE as either Level 1 "support needed" or Level 2 "at benchmark". Students at PEEP exit (after completing preschool) are grouped into three levels; Level 1, "does not demonstrate prerequisite knowledge and skills," Level 2, "has minimal prerequisite knowledge and skills" or Level 3, "has sufficient prerequisite knowledge and skills". The performance classifications are considered separate for literacy and numeracy, where a student may be considered (for example) "level 2" in literacy but "level 1" for numeracy. The performance levels are summarized in **Table 3.**

Table 3. Summary of PEEP Performance Level Descriptors

	PEEP Entry	PEEP Exit
Performance Level 1	Demonstrates limited prerequisite knowledge and skills in literacy or numeracy (support needed)	Does not demonstrate prerequisite knowledge and skills in literacy or numeracy
Performance Level 2	Has sufficient prerequisite knowledge and skills in literacy or numeracy (at benchmark)	Has minimal prerequisite knowledge and skills in literacy or numeracy
Performance Level 3	--	Has sufficient prerequisite knowledge and skills in literacy or numeracy

See Appendix A for more detail on PEEP performance level descriptions.

It is important to note that the PEEP is a relatively new measure, developed by the state to use a common assessment for preschool students. The state of Utah administered the PEEP Exit for the first time in 2021, due to a suspension of state-wide testing in the Spring of 2020 as a result of the pandemic. This is the first time the PEEP has been analyzed in the independent evaluation of the UPSTART program.

The evaluators did not have access to the psychometric properties of the PEEP and cannot report on reliability or validity of the measure. The evaluators used untransformed (raw) PEEP scores to conduct the descriptive analysis.

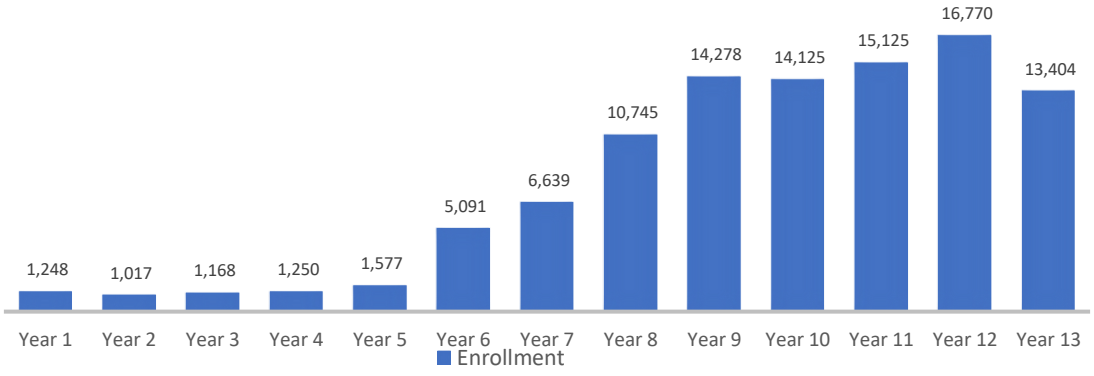
PROGRAM IMPLEMENTATION STUDY

The following section presents our findings from Year 13 of UPSTART implementation. Waterford provided a comprehensive dataset to ETI including 2021-2022 UPSTART enrollment, demographic information, provisioned educational technology, UPSTART program usage, and whether or not children completed program requirements as defined by Waterford.

UPSTART Enrollment

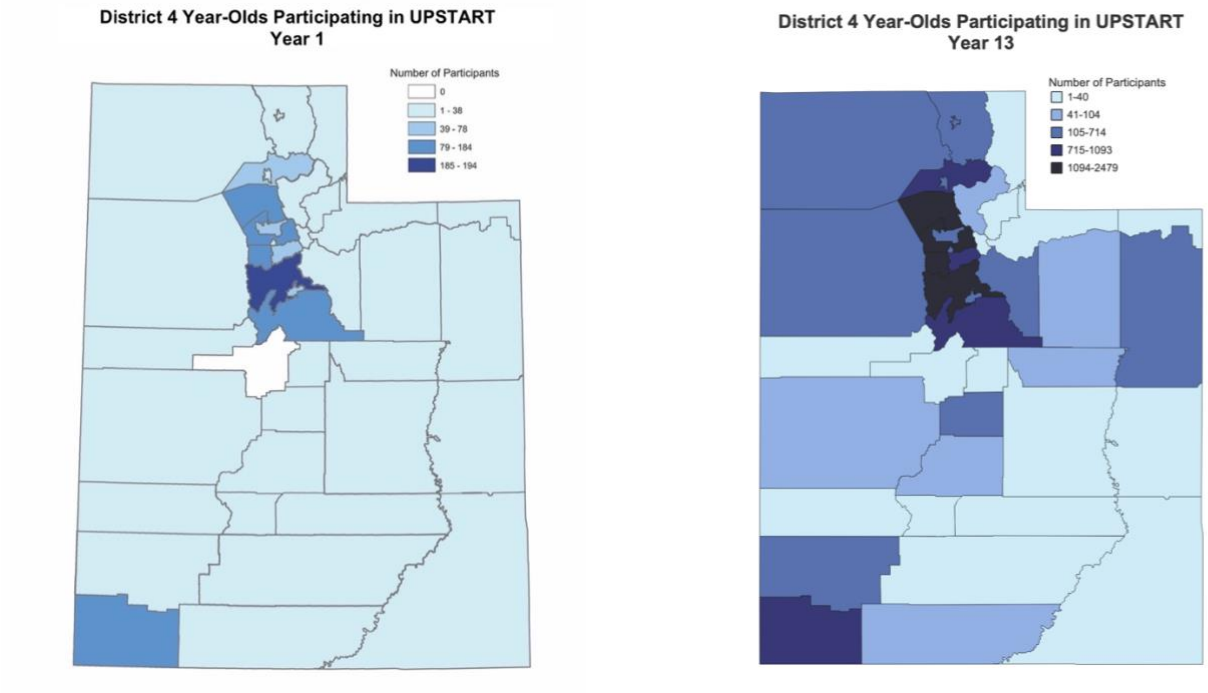
The 2021-2022 program year enrolled 13,404 preschoolers into C13, less than the previous year's cohort (N = 16,770). **Figure 1** illustrates the growth of the program's reach over time from (Year 1, N=1,248) to the most recent Year 13 (N=13,404). The majority of children (91%) used the Waterford website to access the UPSTART curriculum from their home computers. UPSTART provided free personal computers to 8% of the C13 children.

Figure 1. UPSTART Program Enrollment Over Time



The maps depicted in **Figure 2** show the expansion of the UPSTART program's participation by school district over the past dozen years increasing enrollment in both urban and rural areas of the state.

Figure 2. Maps of UPSTART program participation in Year 1 and Year 13 by School District



The demographic makeup of C13 was similar to previous program years, with an equal number of male and female preschoolers. The vast majority of the cohort was White (81%) with 10% from Hispanic origin (**Table 4**).

Table 4. Demographic Characteristics of C13 Population

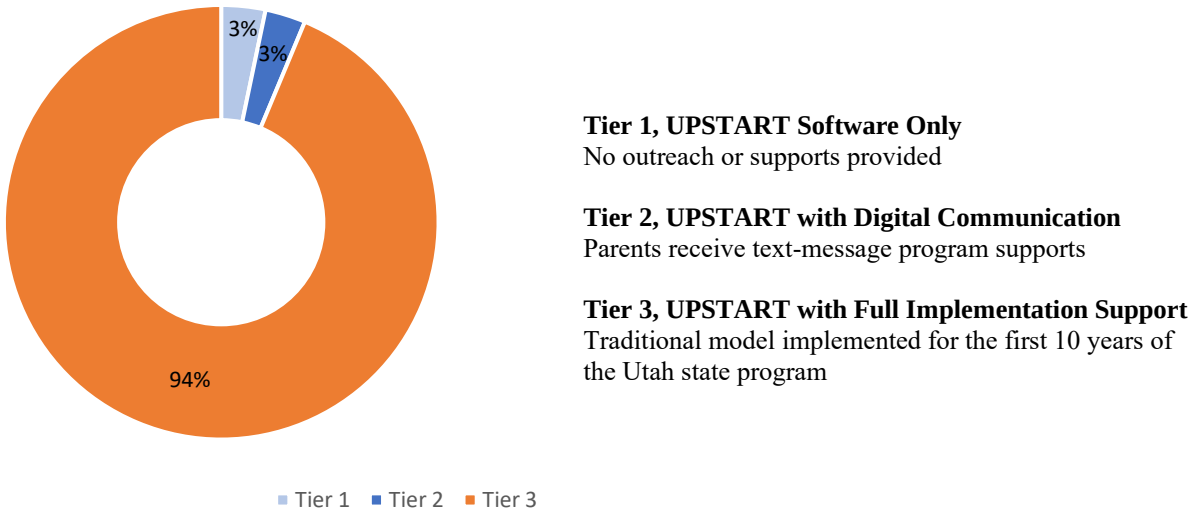
Demographic Categories		C13 UPSTART
Child's Gender		*(n=13,404)*
	Male	45%
	Female	43%
	Unspecified	12%
Child's Ethnicity		*(n=11,173)*
	White	81%
	Hispanic	10%
	Asian/Pacific Islander	4%
	Native American	1%
	African American	1%
	Other	4%
		Missing 16%
Child's Language		*(n=13,404)*
	English	96%
	Spanish	4%
Parent Educational Attainment		*(n=11,607)*
	High school graduate	10%
	Some College	29%
	College Graduate	45%
	Advanced Degree	15%
		Missing 13%
Parent Marital Status		*(n=12,169)*
	Married	92%
	Otherwise	8%
		Missing 9%

Percentages in the table are based on those providing a response in Waterford's participant records and may not add to 100% due to rounding.

ETI acknowledges that not all families provided responses to every demographic question, therefore the percentages represent the proportion among those who provided information. This case-wise deletion method is a conventional, traditional, and simple technique used to manage missing data, particularly when reporting univariate statistics (Schafer, J. L., & Graham, J. W. 2002). For any demographic category with less than the total sample (i.e., 13,404), the sample size of those providing a response is noted within the table. While some missingness is expected among demographic data, 81% of the household income and poverty level data were not available, and therefore excluded from our reporting.

Parents enrolling their children in the program were asked to select the level of support that worked best for their family. All families were given the option to select one of three support tiers. Most participants in the 2021-2022 year selected Tier 3 (n=12,535) with full implementation support, while approximately 400-500 families selected Tier 1 (n=454) or Tier 2 (n=411). As shown in **Figure 3**, Tier 1 and Tier 2 made up about 6% of the program.

Figure 3. Percentage of Tier Selection



We found some demographic make-up differences between those opting for Tiers 1 and 2 and those selecting Tier 3, namely parent education (**Table 5**).

Table 5. Demographic Characteristics of C13 Population by Tier

Demographic Categories		Tier 1	Tier 2	Tier 3
Child's Gender		*(n=454)*	*(n=411)*	*(n=12,535)*
	Male	38%	46%	44%
	Female	49%	45%	45%
	Unspecified	13%	10%	12%
Child's Ethnicity		*(n= 371)*	*(n=357)*	*(n=10,505)*
	White	92%	92%	80%
	Hispanic	2%	3%	10%
	Asian/Pacific Islander	2%	2%	4%
	Native American	1%	<1%	1%
	African American	1%	1%	1%
	Other	2%	2%	4%
Child's Language		*(n=454)*	*(n=411)*	*(n=12,535)*
	English	100%	99%	96%
	Spanish	--	1%	4%
Parent Educational Attainment		*(n=379)*	*(n= 360)*	*(n=10,864)*
	High school graduate	4%	3%	10%
	Some College	22%	24%	29%
	College Graduate	58%	57%	44%
	Advanced Degree	16%	17%	14%
Parent Marital Status		*(n= 405)*	*(n=370)*	*(n= 11,437)*
	Married	98%	98%	92%
	Otherwise	2%	2%	8%

Percentages in the table are based on those providing a response in Waterford's participant records and may not add to 100% due to rounding. Four families did not have tier data; above table represents n=13,400.

It should be noted that families who needed computer equipment in order to participate in the program were required to opt for Tier 3, which is the only level of support where tech is provisioned. Tier 1 and 2, had more educated parents and a greater proportion of families classified as White compared to Tier 3.

UPSTART Usage

The C13 academic year covered 38 weeks of instruction, beginning the week of September 6, 2021, and ending May 23, 2022. Program usage data were analyzed to understand the extent to which families were using the program and meeting requirements for graduation. The average duration in the program for enrolled families was approximately 33 weeks. Waterford's

recommended total usage criteria was 1500 minutes (or 25 hours) across the entirety of the program. The average level of usage for all students enrolled (N=13,404) was approximately 2171 minutes (or 36 hours) of instruction, down marginally from last year but still well above the recommended usage. The average level of usage specifically among those who met the graduation requirement (i.e., 1500+ total minutes or high achievement on WACS[3]), was a total of 45 hours. The Year 13 data for instruction hours are summarized in **Table 6**.

Table 6. C13 Hours of UPSTART Instruction

Group	N	Mean	SD	Range
All UPSTART	13,404	36.18	18.32	0.02-165.33
UPSTART Graduates	9,847	44.83	12.43	1.26-165.33

We also examined if usage with the program differed by the parental support tiers. We found that as the level of support increased, so did the time spent with the program (**Table 7**).

Table 7. Average Total Hours and Weekly Minutes by Tier

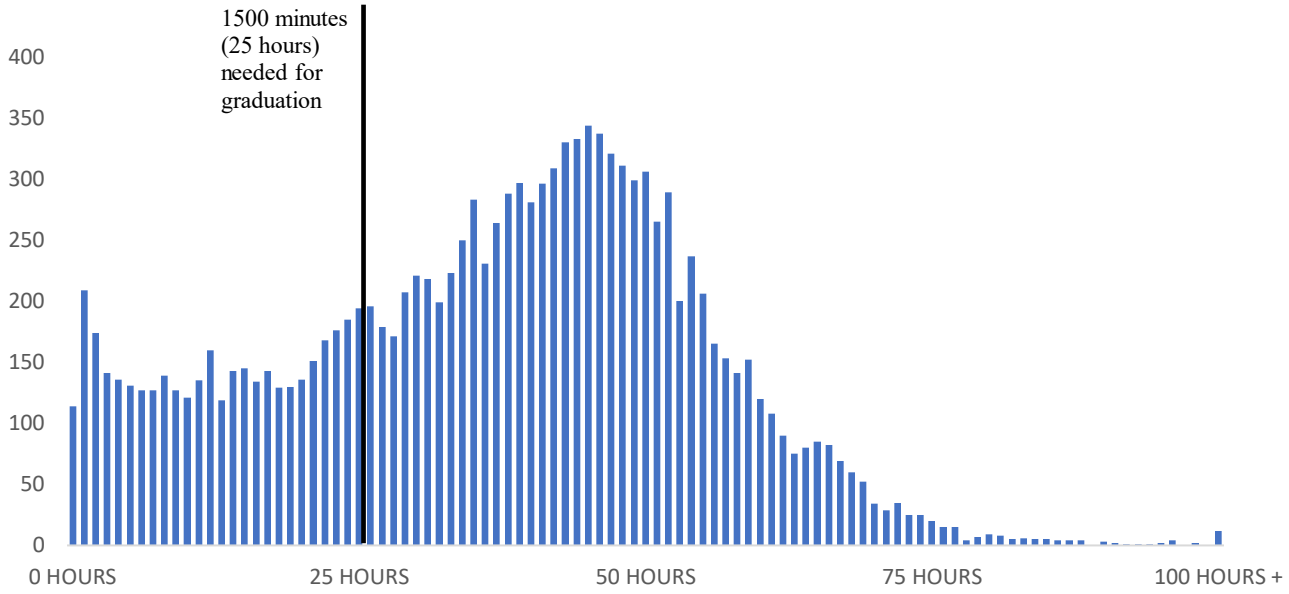
	Avg. Total Hours	Avg. Weekly Minutes
Tier 1	33	56
Tier 2	34	57
Tier 3	36	63

An independent samples t-test was conducted to determine if the average total hours for each tier were statistically different from one another. Results showed that families who received no support (Tier 1) (M = 33, SD = 16.94), spent less time on a weekly basis and averaged significantly fewer total hours with the UPSTART program compared to those who had full implementation support (Tier 3) (M = 36, SD = 18.39); $t(12987) = 3.5$, $p = 0.000$. There was a similar relationship seen when comparing families who received some support (Tier 2) (M = 34, SD = 17.04) and families who had full implementation support (Tier 3) (M = 36, SD = 18.39); $t(12944) = 3.0$, $p = 0.001$

Figure 4 shows the distribution of hours of instruction for the total C13 population (N=13,404). As illustrated, the majority of children exceeded the program's minimum requirement of 25 hours, yet roughly twenty-seven percent logged less than the recommended criteria for program completion.

[3] WACS Waterford Assessment of Core Skills

Figure 4. Distribution of Hours of Instruction for C13 Families.



The bottom quartile of the C13 population completed 23.08 hours of instruction or less, the midpoint of the C13 distribution was 38.42 hours, and the top quartile completed 49.10 hours or more of instruction. Only a few students (less than 20) used the program for 100 hours or more. The pattern of usage across the duration of the program was similar to prior years where dips in program use map to holidays and breaks from school (see **Figure 5**). On average, the 2021-2022 UPSTART children recorded just under the recommended weekly usage amount across the program year.

Figure 5. Average Weekly Minutes of Program Use

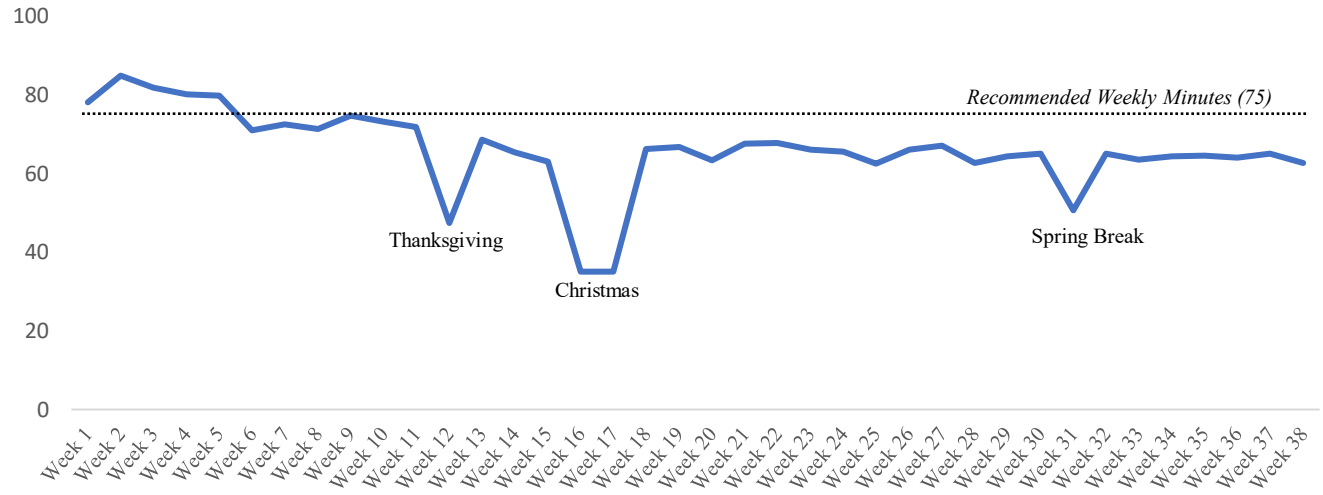
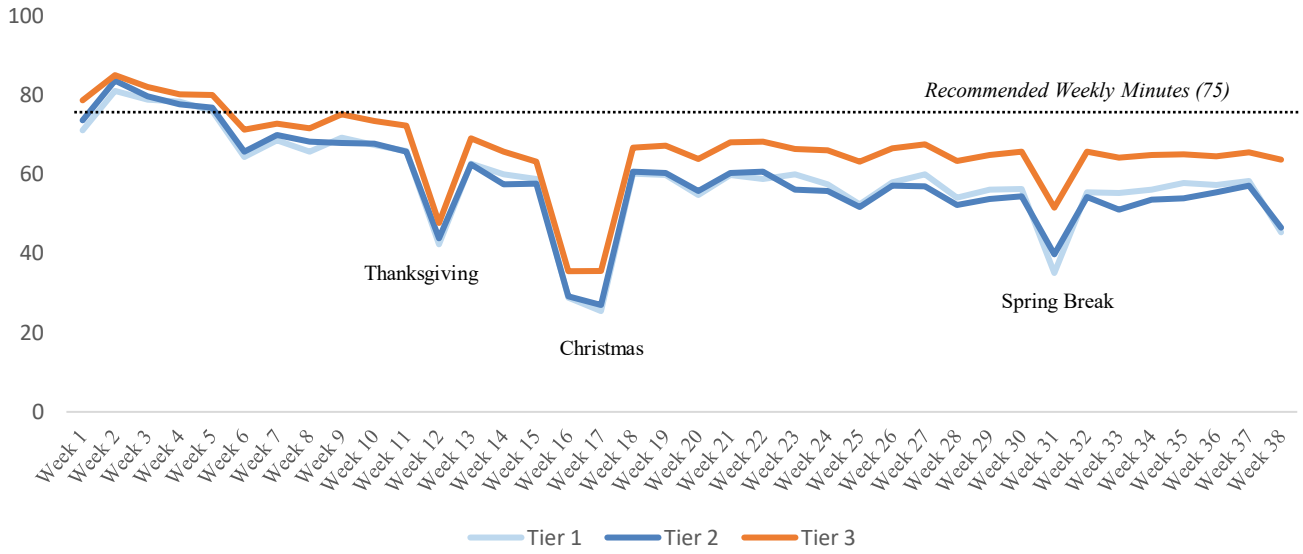


Figure 6 illustrates the same week to week trend for families based on their tier level. Families with more program support (Tier 3), consistently surpassed the engagement of those in the other tiers. Usage between all tiers was similar in the beginning of the program, yet the gap widened as the year went on.

Figure 6. Tier Support and Usage Over Time



The average weekly minutes spent through Week 5 of the program was similar among all three tiers, yet immediately after Christmas break (Week 18), Tier 3 families' usage consistently hovered above both Tier 1 and Tier 2 families by as much as 18 minutes. The pattern of consistent time spent with UPSTART across the life of the program suggests those who received the full implementation support had children who tended to engage more regularly with the program.

UPSTART Graduation Rate

Prior ETI evaluation studies have shown that successful usage and hence graduation from the program were strongly associated with helping children develop school readiness skills. That is, curriculum usage was significantly and positively related to literacy outcomes as measured by early literacy instruments. Children's early skill development serves as a powerful predictor for their future academic success, therefore, the extent to which participants meet the graduation threshold provides important information about the program's ability to impact future outcomes.

Waterford's graduation criteria changed two years ago to include a Waterford Assessment of Core Skills (WACS) score. The WACS is an adaptive assessment, designed to provide precise data for high and low scoring students by testing students on the following core literacy skills: phonological

awareness, vocabulary, listening comprehension, phonics, and reading comprehension[4]. The graduation requirement now takes into account (a) logging at least 1,500 minutes (25 hours of instruction) with the UPSTART curriculum, and/or (b) WACS achievement level.

As seen in **Table 8**, students can meet the graduation requirement in a couple of different ways based on usage and/or achievement level. For example, students with high achievement on the WACS (i.e., demonstrated kindergarten readiness skills) qualify as graduates of the program, regardless of their program usage level (low or high). Additionally, students who meet the usage requirement (regardless of achievement level on WACS) are also considered graduates of the program. About 26% of students had high achievement on the WACS assessment and high usage, compared to only 1% of students who had high achievement and low usage. About 27% of students were unable to engage with the program as recommended and also had either low or no WACS scores, hence not meeting the graduation criteria of the UPSTART program.

Table 8. Waterford Graduation Criteria

	Low Program Usage (Less than 1500 minutes)	High Program Usage (1500 minutes or more)
High WACS achievement	**1%** **High achievement** **Low Usage**	**26%** **High Achievement** **High Usage**
Low WACS Achievement	1% Low Achievement Low Usage	**7%** **Low achievement** **High Usage**
No WACS	26% No EOY Assessment Data Low Usage	**39%** **No EOY Assessment Data** **High Usage**

Graduation rate and categories provided by Waterford; bold text denotes graduate

Waterford classified 9,847 children as program graduates out of the 13,404 enrolled in Year 13. Cohort 13's graduation rate was therefore 73% (i.e., 9,847/13,404 = 0.734), which is down from the graduation rate from Cohort 12 (80%). We found that Tier 3 families had a slightly higher proportion of program graduates (9,257/12,535 = 0.738) compared to the lower support Tiers (Tier 1, 313/455 = 0.689; Tier 2, 274/411 = 0.667). **Table 9** displays the demographic characteristics of graduates and non-graduates within Cohort 13.

[4] Source: Waterford.org

Table 9. Demographic Characteristics of C13 Population

Demographic Categories		UPSTART Graduates	UPSTART Non- Graduates
Child's Gender		*(n=9,847)*	*(n=3,557)*
	Male	44%	47%
	Female	43%	46%
	Unspecified	13%	8%
Child's Ethnicity		*(n=8,043)*	*(n=3,194)*
	White	83%	77%
	Hispanic	9%	12%
	Asian/Pacific Islander	3%	4%
	Native American	<1%	1%
	African American	1%	2%
	Other	4%	4%
Child's Language		*(n=9,847)*	*(n=3,557)*
	English	96%	95%
	Spanish	4%	5%
Parent Educational Attainment		*(n=8,382)*	*(n=3,225)*
	High school graduate	8%	16%
	Some College	27%	34%
	College Graduate	49%	34%
	Advanced Degree	15%	13%
Parent Marital Status		*(n=8,894)*	*(n=3,322)*
	Married	95%	86%
	Otherwise	5%	14%

Percentages in the table are based on those providing a response in Waterford's participant records and may not add to 100% due to rounding.

Children who did not meet the graduation requirements were more likely than UPSTART graduates to be a member of an underrepresented racial or ethnic minority group, have parents with lower levels of education, and reside in families with parents who were not married.

PRESCHOOL PROGRAM OUTCOMES

This section includes our analysis on literacy and numeracy outcomes for a sample of UPSTART students who used the software program in the thirteenth year of implementation. Findings in this

section mirror the way the state presents its annual PEEP results and were analyzed to answer the following research questions:

Research Question 2.1: What proportion of UPSTART students achieved a Level 3 ("proficiency") for kindergarten readiness at the completion of the preschool program year?

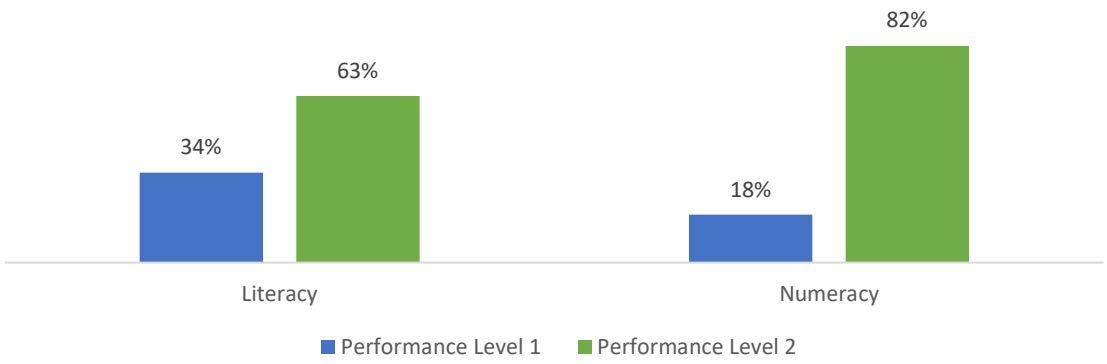
Research Question 2.2: Did UPSTART students with different levels of parental program support (tiers) show differences in early achievement outcomes?

Research Question 2.3: What proportion of UPSTART students classified at the start of preschool as 'needing support' in literacy or numeracy skill development, were classified as "proficient" in those skills by the end of the program?

PEEP Entry Performance Levels

We first examined baseline performance among our UPSTART sample to determine proficiency levels at preschool entry. There were two possible performance levels at PEEP entry, "At Benchmark," (i.e., demonstrated sufficient prerequisite knowledge and skills) or "Support Needed," (i.e., demonstrated limited prerequisite knowledge and skills). Among our UPSTART sample, we found that 63% of students were at benchmark in literacy and 82% were at benchmark in numeracy prior to beginning their preschool year (**Figure 7**; orange bars). This signals that a notable number of the UPSTART students had sufficient prerequisite knowledge (as measured by the PEEP entry) prior to program participation.

Figure 7. UPSTART Student Proficiency Level at PEEP Entry



Literacy and Numeracy- n=352

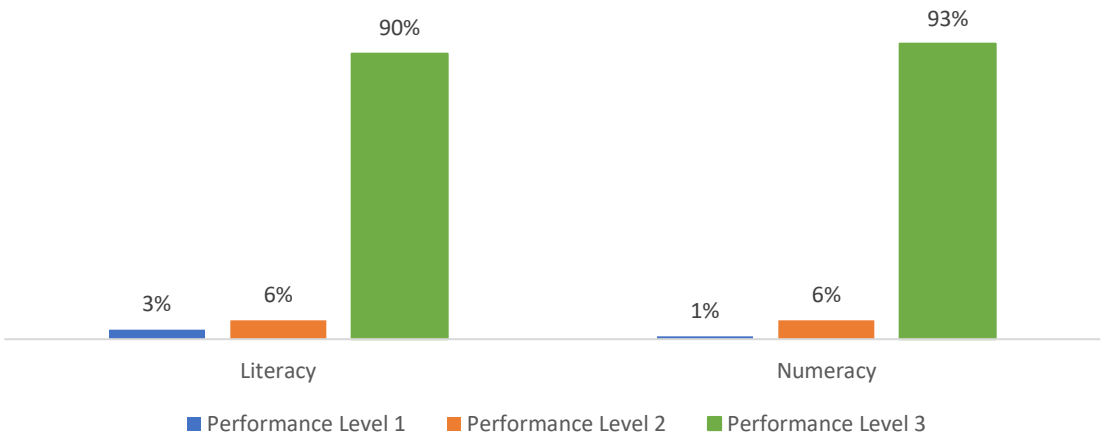
PEEP Exit Performance Levels

What proportion of UPSTART students achieved a Level 3 ("proficiency") for kindergarten readiness at the completion of the program year?

There were three performance levels a student could achieve on the PEEP Exit, which reflected proficiency in prerequisite kindergarten skills and aligned to the level of intervention a student *may* need in kindergarten. These performance levels are not connected to the PEEP entry classifications and are therefore examined independently from the PEEP entry outcomes. A student at performance Level 3 at exit, is considered "Proficient" in either literacy or numeracy and has demonstrated sufficient knowledge and skills for entering kindergarten. Students at performance Level 2 and Level 1 have not demonstrated the necessary skills for kindergarten and may require additional intervention to succeed.

As shown in **Figure 8**, the vast majority of the UPSTART pre-k sample exited the program "proficient" in both literacy (90%) and numeracy (93%), indicating readiness for kindergarten in skills and prerequisite knowledge. Very few UPSTART students were starting kindergarten needing additional support in either domain (9% or 7%, respectively).

Figure 8. UPSTART Student Performance Level at PEEP Exit



Literacy and Numeracy- n=321

Did UPSTART students with different levels of parental program support (tiers) show differences in early achievement outcomes?

To address this question, we examined literacy and numeracy proficiency levels on the PEEP exit assessment across participants in Tier 3 (full parent support), Tier 2 (digital communication support), or Tier 1 (no parent support). As shown in **Table 10**, most students were considered proficient at the end of the program year regardless of parent support tier.

Table 10. PEEP Exit Raw Scores for Literacy and Numeracy by Support Tier

Domain	Tier	N	% at Level 3
Literacy	1	109	72%
	2	111	87%
	3	135	81%
Numeracy	1	109	80%
	2	111	86%
	3	135	82%

We did see directional evidence that those receiving some amount of parent support (Tier 2 or 3) had a higher percentage of students at Level 3 in literacy (87% and 81%, respectively) compared to those in Tier 1 (72%); Tier 1 also had the lowest percentages for numeracy outcomes.

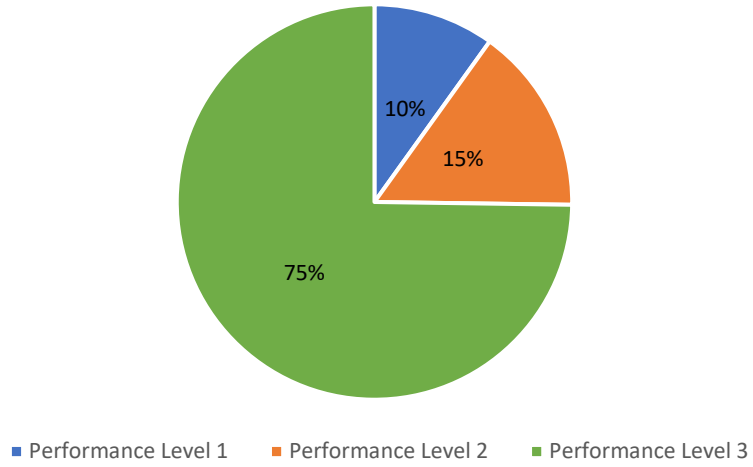
What proportion of UPSTART students classified at the start of preschool as 'needing support' in literacy or numeracy skill development, were classified as "proficient" in those skills by the end of the preschool year?

We conducted an analysis to see how students most in need of support at the *beginning* of preschool, progressed in literacy and numeracy skills by the end of the program year. For the purposes of this analysis, we studied proficiency levels at the beginning and end of the year for students who were most at-risk of falling behind their peers (i.e., only those classified as 'needing support' at on the PEEP entry). We examined literacy and numeracy independently. Looking only at those students who were classified as needing support at PEEP entry, we then mapped those same students to see how they performed at the PEEP exit. We did not connect entry to exit scores in any way, but rather used the USBE's classification system of performance levels to understand potential academic progress among a single group of students[5].

Literacy. Among children classified as in need of support for literacy at the start of the program (n=111), 75% of them achieved 'sufficient prerequisite knowledge in literacy' or Level 3 at the end of the program (**Figure 9**).

[5] For additional information on how USBE defines Performance levels and cut points refer to Appendix A.

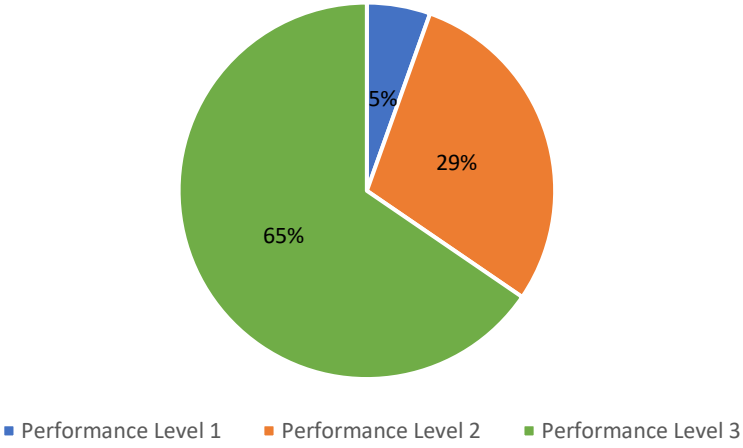
Figure 9. Kindergarten Readiness among Those Needing Support at Entry for Literacy



Students with "support needed" for literacy at PEEP Entry (n=111)

Numeracy. Among UPSTART children in need of support for numeracy at the start of the program (n=55), 65% achieved Level 3 at the end of preschool (**Figure 10**).

Figure 10. Kindergarten Readiness among those "needing support" at Entry for Numeracy



Students with "support needed" for numeracy at PEEP Entry (n=55)

The results show preliminary evidence that program participation may benefit the preschool students most in need of the additional boost prior to kindergarten entry.

COHORT 12 KINDERGARTEN STUDY

As part of the Year 13 UPSTART evaluation, we looked at a sample of the Year 12 students, who participated in UPSTART in the 2020-2021 program year, and who finished kindergarten in 2022.

Cohort 12 Methodology

Kindergarten Research Design. ETI conducted a pretest/posttest treatment-only design utilizing assessment data provided by USBE. We identified a large sample of Year 12 UPSTART students within the state's dataset and then evaluated the kindergarten literacy and numeracy outcomes for those C12 students. The following timeline shows the single group design used to study outcomes in kindergarten.

2020-2021	Fall 2021		Spring 2022
Preschool UPSTART Program Year	KEEP Entry	**Kindergarten**	KEEP Exit

The kindergarten analysis was designed to answer the following research question:

Research Question. What proportion of Cohort 12 UPSTART children began kindergarten with proficiency in literacy and numeracy and what proportion demonstrated proficiency at the end of kindergarten?

Kindergarten Data Collection. We used secondary assessment data provided by the USBE to evaluate the kindergarten literacy and numeracy outcomes for the Cohort 12 UPSTART students. We examined KEEP literacy data for 9430 UPSTART students at entry, 10,304 students at exit; and KEEP numeracy data for 9439 students at entry and 10,318 at exit[6]. Assessments were conducted by kindergarten teachers at the beginning and end of the kindergarten year. We also used student information system (SIS) demographic data provided to us by USBE.

Kindergarten Measures. Our kinder analysis used *Utah's Kindergarten Entry and Exit Profile (KEEP)* to measure the achievement outcomes among our kindergarten treatment students. Like the PEEP, the KEEP consists of two subscales and produces a total score for literacy and a total score for numeracy. All question areas are presented in **Table 11**.

[6] Cohort 12 UPSTART sample sizes are based on those identified in both the state SIS dataset and in the KEEP dataset for the 2021-2022 school year.

Table 11. KEEP Exit Profile

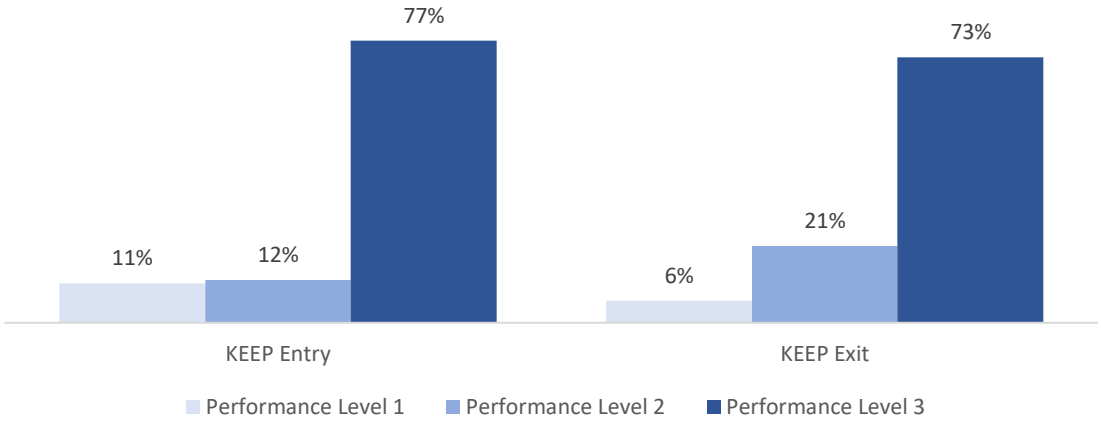
Literacy (Score range 0-118)	Numeracy (Score range 0-55)
Listening Comprehension	Oral Counting
Phonemic Awareness	Counting Objects
Phonics and Word Recognition	Identify and Compare Numerals
Emergent Reading	Decompose Numbers
Encoding	Decompose Numbers
Writing	Compose and Decompose Teen Numbers
	Addition and Subtraction- Word Problems
KEEP Exit Profile updated October 2018	

Students who take the KEEP are grouped into three levels; Level 1, "does not demonstrate prerequisite knowledge and skills," Level 2, "has minimal prerequisite knowledge and skills" or Level 3, "has sufficient prerequisite knowledge and skills." Similar to PEEP, the performance classifications are considered separate for literacy and numeracy[7].

Cohort 12 Student Performance Level at KEEP Entry and Exit

Again, we followed the USBE's format for presenting the results of Cohort 12. As shown in **Figure 11**, 77% of the Cohort 12 UPSTART students began their kindergarten year with sufficient prerequisite literacy knowledge as measured by the KEEP entry. At the completion of the kindergarten year, the majority of Cohort 12 students displayed sufficient knowledge and skills (73%).

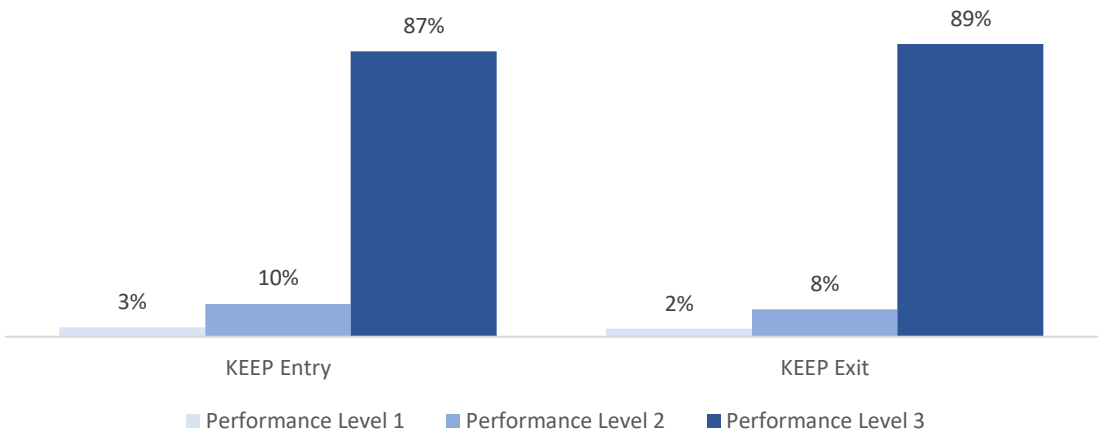
Figure 11. KEEP Literacy Performance Levels at Entry and Exit



[7] See Appendix B for more detail on KEEP performance level descriptions.

Similar to literacy, we analyzed KEEP numeracy data provided by the state. The majority of the Cohort 12 UPSTART sample entered kindergarten at Level 3 displaying sufficient numeracy knowledge and skills (KEEP Entry 87%). By the end of kindergarten, Cohort 12 students maintained those proficiency levels (KEEP Exit 89%, **Figure 12**).

Figure 12. KEEP Numeracy Performance Levels at Entry and Exit



The kindergarten data show that children who participated in UPSTART during their preschool year entered kindergarten ready to go, as measured by the state's KEEP entry assessment. They also maintained those proficiency levels across the course of the school year, as demonstrated in their end-of-year proficiency outcomes. We should note, however, that with a treatment only design, we were unable to attribute these kindergarten proficiency levels to a specific driver including their past participation in the UPSTART program during their preschool year.

SUMMARY & RECOMMENDATIONS

Cohort 13 Program Implementation

During the 2021-2022 program year, 73% of all C13 program students met the criteria for program graduation. This rate is lower than last year (C12) and was based on two main criteria, (1) meeting or exceeding a total of 1500 minutes of program usage, or (2) achieving a high score on the WACS. Nearly all of the children who earned their graduation status, did so by exceeding the usage requirements set forth by Waterford, with a very small minority of children graduating strictly based on their achievement score. Families with children who did not graduate from UPSTART tended to have lower levels of parental education and be members of underrepresented ethnic groups. Graduation is an important program goal, and families with these risk-related characteristics may benefit from extra program resources to help them achieve it.

The implementation data suggest that families with comprehensive program support, Tier 3, demonstrated higher levels of consistent usage. Tiers 1 and 2 had lower average use over the life of the program.

Cohort 13 Literacy and Numeracy Achievement Outcomes

Our pretest/posttest (treatment only) analysis found that at the end of the UPSTART program, most preschool students were considered proficient in literacy and numeracy and thus ready for kindergarten. We also observed a higher proportion of Tier 2 and Tier 3 students achieving literacy proficiency at PEEP exit compared to Tier 1.

Study Limitations

We have identified three possible limitations to consider when interpreting the evaluation results: research design, measurement, and program tier sample characteristics.

Research Design Limitations. The USBE requested a program group (only) pretest-posttest research design be used to study the PEEP and KEEP proficiency levels of students in the UPSTART program. This research design does not include a control group, or group of similar non-program students to use as a comparison for the effects the program had on students. Without the comparison group, we cannot make direct causal statements about the impact of the program on students' literacy and numeracy outcomes beyond the descriptive analysis presented here.

Historically, the Utah UPSTART evaluation study has used a quasi-experimental design where we match demographically similar control students to our treatment students and compare outcomes at the end of the program. Data for the control group would be provided by the state containing both entry and exit assessment outcomes. In order for this matching strategy to be successful, two critical criteria must be in place, (1) key demographic data for both the treatment and control students must

be collected and available, and (2) the student populations from both the treatment and control groups should allow for demographically similar samples, allowing for a sufficient matching process. Over the last couple years, ETI has learned that the demographic data collected from comparison preschools are extremely limited and/or not collected at all. Additionally, the state-wide PEEP administration has been limited to certain types of preschools (according to USBE, do not represent average preschool students across the state). The combination of both of these limitations has prevented us from creating an adequate control group in Year 13.

Measurement. We had limited information about the PEEP's psychometric properties, as well as scoring procedures that would go beyond raw summative scores (such as age standardized scoring or other methods). In consultation with the USBE we used raw summative scores for treatment students in our analysis, which are not standardized by age. This limited our ability to interpret the PEEP mean scores and thus the performance level outcomes.

Tier Sample Characteristics. Parents were not randomly assigned to program support tiers, which would naturally control for extraneous variables that may influence outcomes. Instead, they self-selected the tier level most appropriate for their family. Differences likely existed between families selecting a *full support* tier vs a *no support* tier. For example, families who opted for no support (Tier 1) may be families who have had older children in the UPSTART program and don't require the support that presumably a new family may need. Their preschool-aged children may also have had previous exposure to UPSTART, which may give them an advantage over other new program students. Other families may be more hands-on and prefer to organize themselves around their child's engagement with the program, a family characteristic that may have influenced student outcomes. The reasons for selecting support level, therefore, should be further explored in order to determine how they may impact child achievement outcomes.

Recommendations for Future Research

There are several things that we would recommend for improving future evaluations, based on lessons learned in the last couple of years.

- Where possible, future preschool evaluations should use a quasi-experimental matched treatment and control group research design so that causal statements about program impacts can be evaluated. Further discussions are needed with USBE to uncover possible solutions to the reported limitations. We look forward to discussing the potential to broaden the administration of the PEEP to a wider range of the pre-k population, and also the ways we can obtain a richer more meaningful battery of demographic characteristics among control families.
- More information is needed regarding the PEEP and KEEP, including their psychometric properties, and possible score transformations such as standardized by age. Raw, unstandardized scores for the literacy and numeracy subscales are not an optimal approach for

understanding an intervention's impact on early achievement.

- We recommend a more thorough investigation into the support tiers through an implementation process evaluation that uses qualitative methods to collect data directly from families using the UPSTART program. The last several evaluations have suggested that the tier system of parent support may influence different levels of program use for children. Tier 3 has shown more consistent and deliberate use of the program, which ultimately may strengthen outcomes. This type of exploration would be used to identify if and what advantages exist in *lower levels* of tier support and/or reasons parents choose less or no support over full support. An implementation process evaluation could be used to explore the family characteristics of those selecting the different tiers.

- Future work examining potential longer-term effects of the UPSTART preschool program into the kindergarten year, may consider leveraging the state-wide averages for KEEP data as a comparison point for the specific evaluation year. The KEEP is administered to a large population of the state's kindergarteners, making it currently more representative than the PEEP assessment. The KEEP as a reference metric should be explored in more detail.

Program Recommendations

As UPSTART's reach within the state grows, it is important to monitor program implementation so that increased enrollment does not erode graduation or usage rates, two key areas for ensuring strong student literacy and numeracy achievement and future program success. Specifically, we recommend that the program vendor consider improving strategies for addressing usage challenges and graduation rates among the most at-risk students. Encourage and promote consistent usage as the building blocks for reaching the total time requirement, but also continue to develop alternatives to time (minutes/weeks) as a measure of program implementation. Not all 'seat time' is equivalent across children. The addition of WACS in determining program graduation/kindergarten readiness is a step in the right direction.

Appendix A. PEEP Performance Levels

The USBE created PEEP performance levels to help further identify student needs. At the PEEP Entry, literacy and numeracy scores fall into two performance levels. For both subscales, students who score within the performance level 1 range (0-23 points) are classified as "support needed" and demonstrate limited prerequisite knowledge and skills in literacy and numeracy. Students who score within the performance level 2 category are considered to be at benchmark. **Table A1** provides more information on the skills associated with each performance level.

Table A1. PEEP Entry Performance Levels

Subscale	Performance Level	PEEP Score Range	Level of Support	Associated Skills
Literacy	Performance Level 1	0-20 Points	Support Needed	Identifies few to no correct objects in the picture, Demonstrates few to no concepts of print, Identifies few to no letters of the alphabet, Draws few to no lines or shapes correctly, Can produce the first part of few to no compound words, Associates few to no sounds to the letters of the alphabet, Responds to a question in an incomplete sentence or off- topic or does not respond
	Performance Level 2	21-31 points	At Benchmark	Identifies most correct objects in the picture, Demonstrates concepts of print, Identifies some letters of the alphabet, Draws most lines or shapes correctly, Can produce the first part of most compound words, Associates some sounds to the letters of the alphabet, Responds to a question on-topic and speaks in complete sentences
Numeracy	Performance Level 1	0-23 Points	Support needed	Identifies few to no shapes, Counts few to no numbers from 1 to 10 Recognizes few to no numbers from 0 to 5, Identifies few to no groups that have more objects
	Performance Level 2	24-32 points	At Benchmark	Identifies all or most shapes, Counts most numbers from 1 to 10, Recognizes most numbers from 0 to 5, Counts objects using one-to-one correspondence up to 5, Demonstrates emerging cardinality in counting, Sorts objects correctly by given category , Duplicates and/or extends

Subscale	Performance Level	PEEP Score Range	Level of Support	Associated Skills
				simple patterns, Identifies all or most groups that have more objects

At the PEEP exit, literacy and numeracy scores are divided into three performance levels. For both subscales, students who score within the performance level 1 range at the exit have not demonstrated prerequisite knowledge and may require significant intervention. Students who are within the performance level 2 range (Literacy - 26-46 points, Numeracy- 18-28 points) have minimal prerequisite knowledge and may require some intervention in order to succeed. Students with the highest literacy and numeracy scores (literacy- 47-108 points and numeracy- 29-36 points) have demonstrated sufficient knowledge and skills and may require minimal intervention to succeed. **Table A2** provides more information on the skills associated with each performance level.

Table A2. PEEP Exit Performance Levels

Subscale	Performance Level	PEEP Score Range	Level of Support	Associated Skills
Literacy	Performance Level 1	0-25 Points	Significant Intervention	Names few to no objects/actions in a picture, identifies no letters of the alphabet, writes few to no letters, isolates few to no first sounds, associates few to no sounds to the letters of the alphabet, demonstrates few to no concepts of print
	Performance Level 2	26-46 points	Some Intervention	Names some objects/actions in a picture and describes it with a phrase(s), identifies few letters of the alphabet, writes some letters, which may include those in their name, isolates some first sounds, associates some sounds to the letters of the alphabet, demonstrates some concepts of print
	Performance Level 3	47-108 Points	Minimal Intervention	Names most objects/actions in a picture and describes it with a sentence(s), identifies some letters of the alphabet, writes his or her name and many letters, isolates many first sounds, associates many sounds to the letters of the alphabet, demonstrates concepts of print
Numeracy	Performance Level 1	0-17 Points	Significant Intervention	Counts few to no numbers from 1 to 20, identifies few to no numbers between 0

Subscale	Performance Level	PEEP Score Range	Level of Support	Associated Skills
				and 10, identifies one to no groups that have more objects, draws one to no shapes
	Performance Level 2	18-28 points	Some Intervention	Counts some numbers from 1 to 20, identifies some numbers between 0 and 10 counts some objects using 1-1 correspondence associates numbers to small quantities less than 5, identifies some groups that have more objects draws some shapes
	Performance Level 3	29-36 points	Minimal Intervention	Counts many numbers from 1 to 20, identifies many numbers between 0 and 10, counts objects using 1-1 correspondence, associates numbers to large quantities less than 10, identifies groups that have more objects, draws most shapes

Appendix B. KEEP Performance Levels

Similar to the PEEP, KEEP performance levels were created to help further identify student needs. Though the score range changes from entry to exit, literacy and numeracy scores fall into three performance levels. At entry and exit, students who score within the performance level 1 range have not demonstrated prerequisite knowledge and may require significant intervention. Students who are within the performance level 2 range have minimal prerequisite knowledge and may require some intervention in order to succeed. Students with the highest literacy and numeracy scores have demonstrated sufficient knowledge and skills and may require minimal intervention to succeed. **Tables B1 and B2** provide more information on each level and the different score ranges at entry and exit.

Table B1. Literacy KEEP Performance Levels

Subscale	Performance Level	KEEP ENTRY Score Range	KEEP EXIT Score Range	Level of Support
Literacy	Performance Level 1	0-25 points	0-68 points	Significant Intervention
	Performance Level 2	26-46 points	69-96 points	Some Intervention
	Performance Level 3	47-108 points	97-118 points	Minimal Intervention

Table B2. Numeracy KEEP Performance Levels

Subscale	Performance Level	KEEP ENTRY Score Range	KEEP EXIT Score Range	Level of Support
Numeracy	Performance Level 1	0-17 points	0-32 points	Significant Intervention
	Performance Level 2	18-28 points	33-44 points	Some Intervention
	Performance Level 3	29-36 points	45-55 points	Minimal Intervention

Evaluation and Training Institute
100 Corporate Pointe, Suite 387
Culver City, CA 90230
www.eticonsulting.org

For more information on the
Evaluation and Training Institute, contact ETI:

Jon Hobbs, Ph.D., President
Phone: 310-473 8367
jhobbs@eticonsulting.org