

# CAMP INVENTION® EVALUATION EXECUTIVE SUMMARY

## ABOUT CAMP INVENTION

Camp Invention is a summer day camp program where children entering grades 1-6 engage in hands-on activities that promote engagement with STEM and the building of 21st century skills (e.g., creative problem solving) through the lenses of invention and entrepreneurship. Educational quality and integrity were important criteria in the development of the Camp Invention program. Developed by educators, the curricula align with state and national standards and are carefully piloted before a national rollout. The program also provides teachers a challenging professional development opportunity to apply new teaching methods and view the learning environment in imaginative ways. Schools and districts host Camp Invention across the country.

## ABOUT THE CAMP INVENTION EVALUATION

The National Inventors Hall of Fame® engaged in an independent program evaluation of Camp Invention. This evaluation was designed to better understand and capture the level of impact Camp Invention had on participants' creativity as well as changes in attitudes or future aspiration for invention, entrepreneurship, and STEM learning. The questions that guided this evaluation included:

1. In what ways and to what extent do participants express an increased interest in engaging in invention or demonstrate an increase in aspirations to create and innovate?
2. In what ways and to what extent do participants demonstrate attitudes and behaviors known to foster creativity, innovation, and invention?
3. In what ways and to what extent do participants demonstrate attitudes and behaviors known to foster STEM learning?

The evaluation relied on data and information collected from surveys, pre- and post- Torrance Test of Creative Thinking assessment tasks, and descriptive program information provided by key program team members. A random sample of 26 sites was selected. Evaluators received data from 19 Camp Invention sites (4 were Title I sites and 15 were Traditional sites). Surveys were collected from Camp Invention Instructors (n=654), parents (n=4,066), and participants (n=1,214; 30% from Title I sites, 70% participants from Traditional sites) during the Camps.

## LIMITATIONS

This evaluation used data from a variety of sources, collected data from a variety of stakeholders, and used a number of descriptive and inferential analysis techniques in order to produce valuable findings that were reliable so that the National Inventors Hall of Fame could have confidence in the claims that result from this evaluation. Still, limitations exist in any evaluation. Surveys collect self-reported data from the various stakeholder groups. Self-reported data is known to contain bias that can lead to misinterpretation of results. In addition, these findings highlight a snapshot of participant, instructor, and parent experiences immediately after the completion of Camp Invention. Research shows us that our views of an issue or experience can change over time. Finally, the analytic techniques used allow us only to examine possible correlations between Camp Invention and the various participant impacts examined; therefore, the National Inventors Hall of Fame will be unable to determine if participation in Camp Invention is solely responsible for the observed changes.

## KEY FINDINGS

This evaluation of Camp Invention highlights a number of key findings regarding the impact of Camp Invention on participants and Instructors immediately upon completion of the camp.

### Impact on Participants' Creativity & Creative Problem Solving

Participants demonstrated increases in several characteristics recognized as critical elements to creativity and creative problem solving – specifically fluency, flexibility, and elaboration. Four data sources used for this evaluation highlighted **an increase in fluency** among participants (Alternate Uses assessment task, parent surveys, Instructor surveys, and participant surveys). A number of parent and Instructor survey responses indicated that children generated more ideas and possible solutions to problems as a result of Camp Invention. Upon reviewing results from the two Torrance tests used, the fluency of older participants was more notably impacted as a greater change in scores for the fluency was observed among older participants than younger participants.

<sup>1</sup> In order to assure confidentiality of participants, age data was not collected from participants. However, the educators scoring the assessments made this observation based on their experiences with penmanship, vocabulary and word choices, demonstration of fine motor skills, and a number of other indicators that would allow them to generalize about age.

Participants also experienced **a positive change in flexibility**. This was supported by findings of both Torrance tests as well as the participant, parent, and instructor surveys. The Alternative Uses task results showed a statistically significant change in pre- and post-test scores on flexibility. Both parents and instructors indicated the areas of most notable change in the child/children was the child's ability to come up with unusual or unique ideas – one important indicator of flexibility. In addition, participants' responses showed a statistically significant change on "*I am comfortable changing how I do things*" as well as several items focused on the child's *increased tolerance for ambiguity*.

One additional aspect of creativity showed notable change or growth in participants as a result of Camp Invention participation – **elaboration**. The Incomplete Figures task highlighted a statistically significant change from pre- to post-test on elaboration. The professional educator that scored these assessments made many notes about the improved richness of imagery and the additional or more technical detail included in post-test drawings completed by participants. Both parents and Instructors also noted that their child or the children improved in their ability to demonstrate elaboration in the number and details of possible solutions to problems and the child's willingness to innovate initial ideas into more viable solutions through problem-solving processes introduced as a part of Camp Invention. Program planners are encouraged to look ahead at longer-term impact of this finding. It is worth noting that other studies that have used Torrance Tests of Creative Thinking have highlighted that a positive change in elaboration has the strongest correlation to improved academic achievement. **This means that positive changes in elaboration may be positively related to improved academic achievement.**

<sup>2</sup> Hokanson, B. & Bart, W. (2013). *An Investigation of Levels of Creativity and Scholastic Achievement in School-Aged Students. Proceedings of the AECT 2013 Conference. 327-333 Bloomington, IN: AECT.*

## Impact on Participants' Attitudes and Behaviors that Foster STEM Learning and Future Orientation for Invention & Entrepreneurship

Looking at changes to participants' skills or behaviors first, survey responses from participants, parents, and Instructors point to an **increase in participants' skills to act on or implement new ideas**. This increased willingness to act may indicate an increase in confidence and willingness to take risks observed in responses to other items. In addition, participants, parents and Instructors alike noted **improvement in collaboration and working as a team** among participants at the end of Camp Invention. Finally, parent and Instructor surveys showed strong agreement that Camp Invention **provided participants a valuable perspective of a real-life inventor and entrepreneur** by allowing participants to take apart machines and rebuild them into new inventions.

In addition to the increased willingness to take risks noted in the previous paragraph, some other noteworthy changes in attitudes among participants were highlighted in parent and Instructor surveys. Both groups rated **participants' interest in STEM or invention stronger or much stronger** upon the completion of Camp Invention.

## Impact on Camp Invention Instructors

Instructors report **more willingness to incorporate entrepreneurship concepts into future teaching**. More specifically, Instructors indicated a strong likelihood of increased use of two strategies related to entrepreneurship after using them at Camp Invention: 1) creating an atmosphere of acceptance of people & ideas; and 2) fostering risk-taking.

Instructors report **more willingness to incorporate the following strategies into their teaching in the future: use of inquiry, problem solving challenges, and hands-on experiential learning**. The literature on the positive impact these strategies have on student learning is vast. While many Instructors reported using some or all of these strategies already, the indication that they would incorporate more of these strategies in future teaching is considered a valuable outcome of Camp Invention as it speaks to the transference of Camp Invention on learning for all students the teacher serves beyond Camp Invention.