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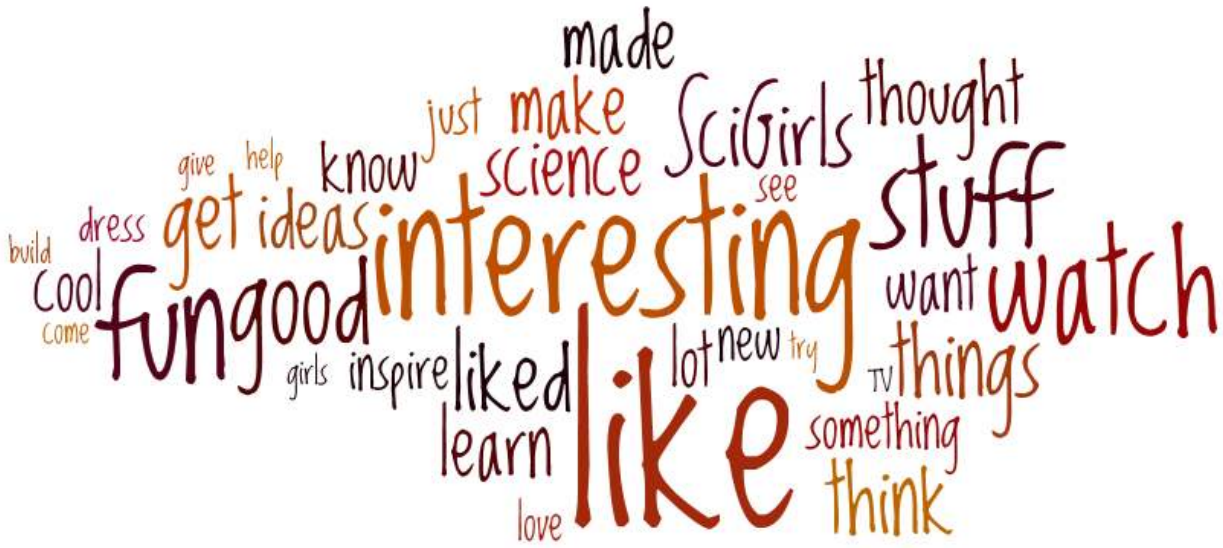
Summative Evaluation of *SciGirls* Television Series Season One



Report for Twin Cities Public Television
by Barbara N. Flagg, Ed.D., Director

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EXECUTIVE SUMMARY
SUMMATIVE EVALUATION OF *SCIGIRLS* TELEVISION SERIES SEASON ONE
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SciGirls is a new weekly public television series produced by Twin Cities Public Television and supported by the National Science Foundation. Twelve half-hour animated and live action shows are accompanied by web and outreach activities in the fields of science, technology and engineering (STEM). Multimedia Research, an independent evaluation group, implemented a summative evaluation of *SciGirls* television programming with a rigorous randomized controlled trial design comparing treatment and control groups. Girls entering fifth grade were assigned randomly either to a treatment group (n = 42) that viewed four *SciGirls* engineering episodes focused on design and build projects or to a control group (n = 42) that viewed four episodes of *Wishbone*, a reading literacy series. Girls viewed programs at home over two weeks, two per week, and completed brief written appeal questionnaires immediately after viewing. Face-to-face interviews about engagement, understanding and confidence followed in the third week. The experimental design permitted assessment of a cause-effect relationship between the *SciGirls* series and its planned outcomes of high engagement, better understanding of the engineering design process, and higher confidence in participating in design and build projects.

Engagement

SciGirls viewers rated the episodes as highly appealing, at a level comparable to that obtained by evaluations of other age-appropriate NSF-funded STEM programming. Three-quarters liked all four episodes; 95% liked *High Tech Fashion* and *Puppet Power*; 85% liked *Going Green*; and 83% liked *Blowin' in the Wind.* All viewers voiced a desire to watch more *SciGirls* shows, because the series was interesting and fun and viewers felt inspired to by the show content. The series is effective in attracting and holding the attention of tween girls.

A review of research literature as to effective strategies that engage girls in STEM in educational settings led the producers to apply a number of these strategies within the *SciGirls* television series: The onscreen real girls and their mentors are shown as "role models" who "collaborate" and "apply their creativity" to "personally relevant and meaningful" projects. Nine in ten (90%) *SciGirls* viewers noted at least one of these four strategies in their open-ended appeal responses, confirming that translating these evidence-based strategies into a television series successfully engages girl viewers. Viewers appreciated that the design projects were important or relevant to their own interests. They liked how the real girls used their creativity and talent to solve problems and complete their engineering projects. The viewers enjoyed the teamwork and constructive interactions of the real girls and identified with the onscreen girls as role models.

SciGirls viewers liked that the animated stories of Izzie and Jake, which frame the live action stories, paralleled the stories of the real girls and that Izzie visited their stories to obtain help with her own problem. Viewers thought the animated stories of Izzie and Jake were funny, valued that Izzie tried to do something meaningful with her projects and particularly enjoyed her creative problem solutions. Viewers enjoyed when Izzie and Jake worked together but did not always appreciate some of the negative comedic interactions between two characters.

Understanding the Engineering Design Process. The evaluation focused on a subset of four *SciGirls* programs in which the onscreen teams create projects that model, implicitly and in varying degrees, the six steps of the engineering design process [i.e., identify the problem; research and brainstorm ideas; sketch and plan; prototype or model; test and redesign; share solution]. In the post-viewing interview, all girls were given a hypothetical project to design and build a bridge over a creek, and the *SciGirls* viewers revealed a significantly better understanding of the engineering design process than the control group. *SciGirls* viewers successfully transferred their learning of steps of engineering design to the new problem of bridge building.

Confidence Related to Engineering Design Process. The evaluation looked at confidence as it pertains to a belief in one's ability to succeed in specific situations –that is a belief in "self-efficacy." The measurement instrument put the *SciGirls* series to a stringent and challenging test by looking at confidence in doing engineering design steps, not for projects that were presented in the four shows, but for two new hypothetical projects. The *SciGirls* viewing group included significantly more girls than the *Wishbone* group who rated themselves "definitely" able to carry out the design steps of *brainstorming* and *testing*. The difference between groups also favored the *SciGirls* viewers for the design tasks of *modeling* and *presenting*, but statistical significance was not obtained for these two tasks.

In conclusion, the summative evaluation of *SciGirls* reveals that the television series succeeds in attracting and engaging girls by incorporating evidence-based engagement strategies into the programs; effectively uses winning fictional and factual narrative stories and characters to improve viewers' understanding of the engineering design process; and provides vicarious experiences through which viewers increase their confidence in their ability to execute the steps of the design process.

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