

Executive Summary

WGBH is pleased to submit the following report to the United Engineering Foundation on the 2011 achievements of *Design Squad*. We greatly appreciate your continuing support, which has helped us launch and sustain efforts that engage tweens, engineers, educators, and parents in investigating STEM concepts and the creativity of invention.

In the last four years, *Design Squad* has developed a rich collection of engineering videos, online games, and hands-on activities that can be used by children at home, in schools, in afterschool settings, and at outreach events to expand their understanding of engineering and invention. Since the series' launch in 2007:

- *Design Squad* and its 90 outreach partners have conducted over 150 trainings for over 6,000 engineers and educators and engaged over 163,000 kids and families with hands-on engineering activities through 447 events and workshops across the country.
- Over 18,000 programs have used *Design Squad's* educational materials, which include six educators' guides (containing step by step directions and leaders' notes for 40 activities) targeted to afterschool providers, engineers, and teachers.
- Online, nearly 32,000 users have submitted almost 98,000 projects to the *Design Squad* user-generated content platform and online community for kids since the feature was launched in October 2009. FIDGiT, an interactive game for kids, has registered 183,430 players since its launch in October 2008.

In January 2011, WGBH launched the spin-off series *Design Squad Nation*, which brought the engineering adventures of the program to kids across the country. *Design Squad Nation* reached 750,000 television viewers in its premiere season. In addition, over the past year, the *Design Squad Nation* website has tallied over 500,000 unique visitors and 1.6 million visits. Further, the program's activity through social media channels has brought *Design Squad's* engineering fun to audiences around the U.S. and the globe.

Adding to the broadcast's and website's reach, *Design Squad* continued to engage children, parents, educators, and engineers through events, trainings, and activities. *Design Squad Nation* remains committed to engaging traditionally underserved audiences, attracting significant Hispanic, African American, and female populations to its engineering curriculum. Further, a 2011 study conducted by Concord Evaluation Group revealed that *Design Squad Nation* demonstrates a positive impact on students' and teachers' understanding of and ability to use engineering concepts, both inside and outside of the classroom.

2011 has also marked the launch of *Design Squad: Informal Pathways to Engineering* (DS: IPE). In coordination with the National Science Foundation (NSF)'s new engineering directives, this initiative looks across informal engineering education programs to investigate how children move from one experience to another and what motivates them to keep progressing along an engineering-related pathway. Lessons learned from this work will provide critical guidance in how to inspire and educate a new generation of engineers. A cornerstone grant from the NSF in September allowed us to greenlight this initiative, and we are currently in the early stages of this project. We look forward to continuing this effort with the support UEF has granted for the coming year.

Summary of 2011 Project Activities

Design Squad Nation

With the support of UEF in 2010, WGBH laid the groundwork for the successful premiere of *Design Squad Nation* in January 2011. A spin-off of the award-winning television series *Design Squad*, the new series' goals were to: (1) address a critical need in engineering education and children's media, (2) increase students' knowledge of engineering and the design process, and (3) showcase engineering as creative, rewarding, and socially relevant, especially among girls and minorities. Charged with these objectives, *Design Squad Nation* took the show on the road, traveling across the country and around the world as co-hosts Judy Lee and Adam Vollmer worked side-by-side with kids to turn wishes into reality through engineering solutions. *Design Squad Nation*'s first season launched on PBS stations around the country with a 10-part series of television shows and video blogs to fuel kids' excitement about engineering.

Each *Design Squad Nation* episode is about taking action, being creative, and changing the world. Moving from city to city, co-hosts Judy and Adam work with local experts to help real kids think like inventors. Each program starts with a kid's wish – to build a human-powered flying machine, to design a cake that moves—and then Judy and Adam arrive to help them make it happen. The episodes model the series of steps engineers and inventors use to arrive at a solution, and experts weigh in to offer guidance and advice. Through this process, viewers see the successes and failures that are a natural part of the design process, and kids are encouraged to think about how they might handle similar situations.

From designing a human-powered flying machine in Miami to building a playground in a rural village in Nicaragua's northern mountains, *Design Squad Nation*'s aim is to inspire viewers to bring a hands-on approach to their own communities. In addition, the program showcases teens and young adults as role models who share their stories and passions. For example, Ronnie, a nineteen-year-old native of the White Mountain Apache Reservation in Arizona, finds a new perspective on his sport by seeing the detailed work involved in creating a skate park. Beatrice, a high school student and jazz band member in Emeryville, California, discusses the pride she took in creating a bicycle that is also a piece of art. And in a web-only episode, Justin, 14, explains that 16,000 trucks drive through his Bronx neighborhood every day, part of the reason that one in four children who reside there have asthma. Motivated to inform and protect his neighbors, he aspires to become an engineer.

All of the season's episodes are available online at the *Design Squad Nation* website (www.pbskids.org/designsquadnation).

***The Website* (www.pbskids.org/designsquadnation)**

The *Design Squad Nation* website is the home base for a multi-platform experience that supports kids as they develop their creative problem-solving abilities. The newly re-designed website launched on December 2, 2010 (timed to build buzz for the January series premiere), and it contains a variety of new features that reinforce multimedia learning and the core goals of the series.

A particular highlight is the *Projects* section, where any kid can submit a ‘wish,’ i.e. a challenge to solve, and other kids respond by submitting their ideas for solutions in a sketch or photo. Functioning like a global brainstorm, the *Projects* section provides a safe, public space where kids from around the world can work collaboratively on creative design solutions. To date, nearly 32,000 users have submitted almost 98,000 projects (wishes and sketches) to this user-generated content platform and online community.

Full episodes from *Design Squad Nation* rolled out online weekly from January through May 2011, accompanied by new web features such as blog posts, videos, animations, and other educational activities. In addition, each of these episodes is tied to a wish in the *Projects* section, where kids are invited to submit their own solutions. For example, after the premiere episode where Adam and Judy work with Apache skateboarders to design a new skate park, kids at home were asked to submit their own ideas for how they would design one for their community. Over 70 kids submitted unique sketches that expressed their ideal layout for a skate park or path.

Design Squad Nation’s website launched two new blogs: *Dream It! Build It! Blog It!* (for kids) and *Dream It! Build It! Teach It!* (for educators, parents, and engineers). The kids’ blog includes a behind-the-scenes view of Adam and Judy having fun as they solve engineering challenges as well as other resources from PBS Kids sites and kid-friendly examples hand-picked from across the Web. In addition, a commenting feature creates a safe, moderated environment where kids can engage with the hosts and each other about the TV show and the design process – asking questions, sharing design successes and failures, answering calls to action, or giving someone a shout-out. The educator’s blog highlights the latest in engineering education, promotes education resources available on the *Design Squad Nation* website, and provides creative ways to incorporate these resources into the classroom. A moderated commenting feature allows parents and educators to share their experiences and lessons learned, ask questions, and provide feedback to others in the education community.

Social Media

The *Design Squad Nation* website is just one place in a network of content that expands beyond PBS Kids and onto social media platforms. Other outlets include the following:

Facebook – The social network service has provided the opportunity to reach audiences unfamiliar with the TV series, and also has deepened the connection with fans of the show. Targeting teens, the Facebook page (<http://www.facebook.com/DesignSquadNation>) offers content from the series, invitations to dialogue, and calls to action, and it also serves as a video distribution platform. A successful Facebook ad campaign more than doubled the size of *Design Squad Nation*’s online community (from 2,930 to 7,394) and significantly increased the young teen (13-15) demographic from 49% to 78%. In addition to expanding the program’s reach on Facebook, WGBH also developed a Facebook app to allow fans to play the *Design Squad* game FIDGiT directly on the popular social networking site, making it possible for them to share their progress with friends and further spread engagement and exposure.

Twitter – As adults are the primary users of Twitter, *Design Squad Nation*’s Twitter presence (<http://twitter.com/designsquad>) focuses on parents and educators. The Twitter feed promotes *Design Squad Nation* content and events of interest while highlighting related news and tips from

the education arena. By engaging in conversations with its network of followers, *Design Squad* encourages active participation.

YouTube – The *Design Squad Nation*-branded channel on YouTube (<http://www.youtube.com/user/DesignSquadNation>) and YouTube’s embedding feature provides another means for distributing content, including the broadcast episodes, DIY, and Blog videos. Since its launch, there have been over 188,000 video uploads.

The Build Big Contest

Capitalizing on the success of 2010’s Trash to Treasure contest, in 2011 *Design Squad Nation* launched Build Big, a competition that invited teams of kids (and an adult team leader) to “super-size” *Design Squad*’s hands-on activities and make a video of it in action. Contestants entered by uploading their video to their own YouTube account and then submitting a link.

This contest ran from March 22, 2011 – August 1, 2011. From a group of impressive entries, *Design Squad* identified 12 finalists, whose projects ranged from large-scale paper furniture to a giant solar water heater. The top three entries were:

- Paul, Kalin, and Robert’s “String Thing” (winner), which brought to life *Design Squad*’s online game that teaches about sound and music with a full-scale “String Thing” instrument. Their musical device is tuned to play Bach’s “Jesu, Joy of Man’s Desiring,” but is completely customizable by adjusting the strings’ length and tension.
- Katie, Sonia, and Connor’s “Brilliant Bamboo Boat” (runner-up), a life-size version of the “Watercraft” activity from the *Design Squad Activity Guide*; and
- Lilly and Mary Ann’s “Electromagnetic Crane” (runner-up), based on the *Design Squad On the Moon Guide*’s “Heavy Lifting” crane activity.

Paul, Kalin, and Robert received a Flip™ camera and the opportunity to video chat with *Design Squad Nation* hosts Judy and Adam, as well as a highlight on the main contest page of the website. (Videos from the winners and finalists can be viewed at <http://pbskids.org/designsquad/blog/2011/08/winners-of-the-build-big-contest.html>)

Educational Outreach

Throughout the course of 2011, *Design Squad Nation* continued to offer opportunities for in-person and online engagement – via webinar and live trainings, as well as at a series of high-energy public events to bring engineering to life for children, parents, educators, and engineers. Highlights from the many activities include:

- **Webinars:** In January, the *Design Squad* outreach team hosted a webinar for more than 40 professional engineers to help them inspire kids via the collection of *Design Squad* resources. Also in January, in preparation for National Engineers Week, *Design Squad Nation* hosted a webinar for 40 Northrop Grumman employees that addressed the online resources available from *Design Squad Nation* as well as ways to include our hands-on activities in events. In September, *Design Squad Nation* also hosted two webinars for formal and informal educators that highlighted resources from *Design Squad Nation* and other WGBH programs—one in partnership with PBS Teachers and the other with the American Society for Engineering Education’s “Engineering, Go For It” program.

- ***Design Squad Nation Family Day, New York Hall of Science, January 15, 2011:*** Partnering with the New York Hall of Science and New York City’s PBS station, WNET, *Design Squad Nation* put on a show for the 1,500 that attended. Hosts Adam and Judy presented on-stage, and activity stations gave kids an opportunity to try their hands at four *Design Squad Nation* challenges. To take full advantage of Adam and Judy’s time, we also held a small event at The Madison Square Boys and Girls Club in Queens, where 100 kids and 15 leaders saw Judy and Adam demonstrate the “giant Pop Fly” after trying the activity for themselves.
- ***Discover Engineering Family Day, National Building Museum, February 19, 2011:*** Held in conjunction with National Engineers Week, this national event attracted nearly 14,000 attendees. Throughout the day, Judy and Adam gave six stage shows, where they used the “giant Pop Fly” catapult to launch balls into the crowd. *Design Squad Nation* activities were offered by four different engineering partner organizations. In addition, host public broadcaster WHUT displayed “Pop Fly” prototypes at its table and directed kids to the Society of Professional Engineers (a WGBH partner), where they could design their own catapult and receive a stamp in their passport. Many kids were so excited about their creations that they came back to the WHUT table to show off their machines.
- ***Design Squad Nation Ingenuity Day, Lawrence Hall of Science, February 26, 2011:*** *Design Squad Nation*’s large-scale public events finished at the Lawrence Hall of Science in Berkeley, California, in partnership with local public broadcaster KTEH (now KQED Plus). The 740 who attended this event could try several hands-on activities, meet Judy and Adam, and watch them demonstrate the “super-sized Pop Fly” catapult both inside the museum and in the museum’s outdoor space. As in New York, to maximize in the impact of our trip to California, we also held an event at a local Boys and Girls Club in Palo Alto for 100 kids and six leaders.
- ***Smart Schools: Lessons Learned from Schools Successful in STEM Symposium, Drexel University, September 19, 2011:*** *Design Squad Nation* was showcased at this event hosted by The National Science Foundation that brought together political and government leaders and educators to share effective approaches in STEM education.
- ***Invent It. Build It., Chicago, October 15, 2011:*** *Design Squad Nation* took center stage at the Society for Women Engineers (SWE) convention in Chicago as a part of the second annual *Invent It. Build It.* event. Over 140 SWE members mentored over 280 girls as they did *Design Squad* activities. In addition, 86 parents participated in a parent program that featured hands-on activities, resources for talking to girls about engineering, and steps to getting their daughters into a college engineering program. Deysi Melgar from Season Two delivered the keynote address. According to SWE, after the event, girls reported that they were twice as likely to have an interest in becoming an engineer. (<http://alltogether.swe.org/blog/invent-it-build-it-a-proven-success-.html>)
- ***Girl Scouts National Convention, Houston, November 8-13, 2011:*** At the Girl Scouts National Convention, *Design Squad Nation* hosts Judy Lee and Adam Vollmer (along with WGBH Outreach) led a session for 350 girls participating in the Girl Scouts Leadership Institute, where they learned about the show and the design process. Immediately following, Adam and Judy led smaller groups of 50 girls through the process they use at IDEO to design for their clients. Outreach trainer Susan Buckey also led a smaller session focusing on engineering with an eye towards the environment, and

introduced the girls to several of our mini-documentaries profiling engineers involved in environmental endeavors.

- **Additional Trainings:** Apart from these events, the *Design Squad Nation* team has provided other trainings that include: the Museum of Science Gateway Institute Conference (reaching 40 K-12 educators and administrators); the NSTA Regional Conference (reaching over 30 New England educators); the National Summer Learning Association in San Francisco (reaching 40 summer educators); and the Massachusetts Association of Science Teachers conference (reaching 25 Massachusetts educators).

In partnership with the International Technology and Engineering Educators Association (ITEEA), *Design Squad Nation* is also providing content for its publications. In 2011, we published eight two-page articles in its *Technology and Engineering Teacher* magazine, and we also published activity sheets for four hands-on activities in *Children's Technology and Engineering* (which targets teachers of younger students). This partnership brought *Design Squad* activities to engineering and technology educators nationwide, and we will continue to provide them with content in the coming year.

Publicity & Station Relations

Since the series premiere in January, *Design Squad Nation* has been covered in such top tier news publications as *The New York Times* and *New York Daily News* as well as a range of other publications and outlets targeting kid viewers (*Teen Vogue*; *Kids Place Live*), tech enthusiasts (CNET.com; *Make*), and STEM educators and professionals (*PE: Professional Engineers; Technology and Engineering Teacher*). Co-hosts Adam and Judy were featured in Time Warner Cable's *Connect A Million Minds* initiative alongside such STEM heavyweights as Dean Kamen, Sally Ride, and Bill Nye. In addition, Judy was profiled in *NOVA's Secret Life of Scientists and Engineers* web series.

A particular highlight was the series' appearance on *Jeopardy!*, the popular and enduring quiz program that averages more than eight million viewers. *Design Squad Nation* was featured as an entire category on the February 24, 2011 episode of *Jeopardy!*'s Teen Tournament. Timed to coincide with National Engineers Week, this appearance marks the second time *Design Squad* content has illustrated STEM concepts in the *Jeopardy!* student series. The *Design Squad Nation* category featured five video "clues" taken from *Design Squad Nation* episodes.

Web buzz from bloggers and parenting sites has helped publicize the series as well:

Parents need to know that this smart, thought-provoking series – which is a spin-off of Design Squad – is a great way to introduce kids to the practical applications of science and engineering. – Common Sense Media, <http://www.commonensemedia.org/tv-reviews/design-squad-nation>

The thought and creativity that went into not only developing the show but putting the web content together is simply wonderful. PBS has taken your average Saturday morning science show and cranked it up well beyond what any other show that has been designed for this purpose has ever even come close to. – Robert Hilgendorf, Yahoo! Contributor Network, www.associatedcontent.com/article/7918131/pbs_helps_kids_to_consider_engineering.html?cat=25

One of the things I liked most about Design Squad Nation is their inclusive outlook and the way the students participating on the show reflect the diversity of our nation. – Mommy Maestra, <http://www.mommymaestra.com/2011/04/design-squad-nations-build-it-big.html>

The Impact

Design Squad Nation reached 750,000 television viewers in its premiere season and over the past year tallied over 500,000 unique visitors and 1.6 million visits to its website. Among *Design Squad* viewers, 37% are Hispanic, a percentage that is higher than their representation in the population as a whole, and 13% are African-American households. We feel that these demographic numbers positively reflect our efforts to show a diverse view of engineering and engineers.

This diversity can be seen in the visitors to our website as well. A survey of our website visitors conducted in February and March 2011 by the Concord Evaluation Group (in conjunction with one conducted in 2010) determined that over the past two years visitors to the website were:

- Twice as likely to be female rather than male.
- Racially, ethnically, and economically diverse – in 2010 and 2011, over 40% were non-white, ethnic minorities, and 14% percent perceived themselves to be low-income, consistent with the U.S. poverty rate of roughly 13% in 2008.
- Representative of a diverse array of individuals from across the country. During the surveyed period, the website received visitors from 49 states (all but Wyoming). The District of Columbia. Texas, Florida, Massachusetts, California, and New York were the states most heavily represented.
- More likely to be homeschoolers than might be expected based on the national proportion of homeschoolers (11% of website visitors versus 3% nationally).
- The median age of the website visitors was 12, matching well with *Design Squad's* target audience (9-12 year olds).

As was true in 2010, in 2011 most adults visiting the website reported that they were teachers, volunteers, parents, and engineers—consistent with *Design Squad's* target adult population. The website also received visits from educators in informal educational settings like museums, afterschool programs, and camps. In addition, most adult visitors considered themselves to be middle income; however, low and high-income visitors were also represented.

In a separate 2011 evaluation, Concord Evaluation Group also found evidence that *Design Squad Nation* had a positive impact on students and teachers. For instance, after using the project's resources, middle school kids were significantly more likely to:

- Demonstrate an understanding of key science and engineering concepts and demonstrate an ability to identify and discuss the science concepts they applied.
- Demonstrate an understanding of the engineering design process and demonstrate an ability to explain and use the engineering design process.
- Understand the type of work that engineers do.
- Believe that engineers have cool jobs.
- Believe that engineers come up with new ideas and inventions.

- Understand that engineers design and build things to meet people’s needs.
- Believe that engineers help make people’s lives better.
- Report an interest in designing and buildings things in their classrooms and during the summer.

They were also significantly less likely to view engineering as boring, to believe that men are better at engineering than women, or to believe that only “super smart” people can be good at engineering.

In addition, roughly half the kids reported that they were more interested in engineering after completing the *Design Squad* challenges, and that they thought it would be “cool” or “very cool” to be an engineer someday.

These studies also identified a positive impact on teachers:

- Two-thirds of the teachers reported that they were *more interested* in integrating hands-on design challenges into their classrooms after using the challenges.
- These same teachers also told us that the challenges helped them to feel *more comfortable* providing engineering activities to their students.
- All of the teachers reported that they understood the engineering design process, and one-third reported that their understanding was much better now as a result of using the challenges.
- A majority of teachers told us they *know more* about engineering careers after using *Design Squad Nation*.
- All of the teachers reported that they were very likely to use the challenges again.
- Most of the teachers reported that they would recommend the challenges to other teachers.

Next Steps: Informal Pathways to Engineering

Many of the activities and results described above are a consequence of efforts funded in part by the United Engineering Foundation’s 2010 support. It is a great pleasure to be able to share these successes with you, and we hope that you share our excitement in seeing this investment fully realized this year.

We are now moving on to our next major phase of *Design Squad’s* work. *Design Squad: Informal Pathways to Engineering* (DS: IPE) is a coordinated research project that will explore the success of informal education experiences in awakening and sustaining children’s interest in engineering. We developed this project in alignment with a larger NSF-funded effort among informal engineering education programs to investigate how children move from one engineering experience to another, and what motivates them to keep progressing along an engineering-related pathway.

In conjunction with Purdue University and Concord Evaluation Group (CEG), WGBH will conduct a qualitative, longitudinal study of 60 middle school children from Massachusetts and Indiana that will examine the ways in which informal engineering programs support (or fail to support) children’s engineering-related interests, outcome expectations, and self-efficacy. Over a 30-month period, researchers will focus on children who use *Design Squad* to see how their

interest in and use of the project's resources relates to actions such as watching engineering programs on television, visiting exhibits at museums, or participating in clubs or competitions. Additionally, the study will aim to determine the amount of exposure (and at what point it occurs) that is necessary to set these behaviors in motion. Through the DS: IPE study, WGBH and its partners will gather rich, descriptive data about the factors that contribute to children's decision processes as they relate to engineering activities, probing children's behavior over time, and tracking students across school and out-of-school environments. WGBH's overarching goal is to ultimately develop a more complex picture of how students' interest in engineering is kindled, how different experiences set children on pathways, and how these pathways can be changed or reinforced by later actions.

Further, DS: IPE will have broader significance, contributing to the larger knowledge base about informal engineering education both through its data and its design. To maximize its impact, WGBH, CEG, and Purdue have forged strategic partnerships with Project Lead the Way, Girl Scouts of the USA, National Engineers Week Foundation, National Girls Collaborative Project, FIRST, ITEEA, and ASTC. Once the study is completed, we will encourage these groups to make use of the study template and to compare their data against our own. Their use of these resources will, in turn, begin to build a cumulative body of knowledge that will ultimately support the informal engineering field's ability to inspire more children to pursue engineering pathways.

Design Squad received cornerstone support from the NSF in September to use our series, resources, and outreach efforts as vehicle for testing the effects of informal engineering experiences in sparking long-term interest and participation.

In a change that correlates with this initiative, *Design Squad Nation* will become a broadband-only series. This reflects the media consumption behaviors of our demographic audience (tweens) as well as the web and mobile focus of many of our activities. The NSF has staked its support on broadband, and we feel that this commitment will fuel the evolution of the series.

As a part of this project, *Design Squad Nation* will also maintain and grow its intensive outreach campaigns, partnerships, and interactive web presence through the following:

- Six new online units centered around themes (“Helping Others,” “Making Music and Art,” “Having Fun/Playing Games,” “Moving Places,” “Playing Sports,” and “Being Green”) embedded in an overarching game experience where players receive engineering challenges via their mobile device, the website, or email;
- Six new hands-on engineering activities with accompanying how-to videos hosted by *Design Squad* hosts, optimized for kids to play on their cell phone or other media device;
- Six online contests that inspire young inventors;
- Six online contests that inspire young inventors;
- A collection of 98 short videos for the *Design Squad* website (including profiles of young inventors, DIY videos, contest winners, and Q&A's with the *Design Squad* hosts) to build awareness and reach kids increasingly spending more of their viewing time online;
- A “Design Wall” website feature that will enable kids to sign up in teams and combine their ideas to create solutions for a challenge;

- Four community-based public events in four cities across the country, the goals of which are to convene kids and their families around the excitement of engineering and celebrate the achievements of young inventors and makers in the community;
- Collaborations with Girl Scouts of the USA, National Girls Collaborative Project, and National Engineers Week (E-Week) to conduct trainings in four communities—Northern California and three other cities. Two trainings will be held in each city, one for volunteer engineers and one for afterschool leaders (including Girl Scout leaders).
- Support for a network of 90+ partners who host *Design Squad* events and trainings; and
- Marketing/promotion of *Design Squad* to media stakeholders and PBS stations. WGBH’s social media feeds will also link STEM resource links to media, bloggers, and stations.

2011 Activities: Research and Development

While we are only three months into DS:IPE, we recently completed a research and development phase to understand the best ways to engage kids at home in engineering activities. Below, we have included our top-line conclusions and goals for strengthening *Design Squad Nation* and expanding its impact.

From our **data analytics review**, we learned where we have strategic opportunities for increasing and improving participation:

- We should entice users to submit more frequently and more repetitively through gaming strategies, better rewards for approved submissions, and calls to action through email/newsletter outreach.
- We should seek to improve the quality of submissions by providing more guidance in our calls to action and by bringing ‘model’ submissions to the forefront.
- We should use linking through blog, Facebook, and other platforms to improve visibility and awareness.
- That we should explore outreach events as an opportunity to solicit feedback and survey responses to the website.

From **focus groups with kids between the ages of 9-12**, we learned what these target audiences would like to see:

- Focus on CREATIVITY and DOING.
- Make it fun but start easy – build on what kids know, use easily accessible materials, offer a chance to compete or earn points, etc.
- Make it relevant – show real world applications and related materials outside of *Design Squad Nation*.
- Find a connection between kids’ interests and engineering.
- Offer everything – step-by-step projects and open-ended challenges, pranks, trivia, etc.
- Promote community with comments, ‘likes’, competitions, etc.
- Keep it fresh with regular updates that provide a reason to return, and roll out new videos on a weekly basis.
- Be flexible, but provide a journey – always offer a next step or connections to other areas of interest.

- Grab attention with something cool – something funny, something crazy, a topic that interests kids.
- Put video front and center – make videos a crucial link in the visitor’s journey through the site, and play video on the homepage.
- Improve findability through video titles, tagging, and linking.
- Create a site-wide gaming experience, and offer points and rewards.
- Make the website more personal/customizable.

We also tested hands-on do-it-yourself projects with these focus groups and learned that kids like “fun” projects, which they define as challenges, tricks, pranks, and jokes, but also practical things like locker organizers or jewelry stands. They also want to know what they are getting into before they begin (how long it will take, how it is supposed to work when completed). These conversations also underscored that we need to lower the barriers-to-entry as much as possible – even something as simple as a trip to the grocery store can prevent a kid from participating. Further, we need to revise or relocate existing projects to be more kid-friendly. A child is not going to download and work from a .pdf activity sheet, so we need to either move those activities to the parents and educators section or reversion them so that they can be more easy and appealing for kids to use.

We are now in the process of sifting through this information to inform our strategies and plans for the DS: IPE work going forward. We look forward to beginning the research in the spring of 2012, which will extend over the next three school years.

Conclusion

On behalf of WGBH and the entire *Design Squad Nation* team, we would like to thank the United Engineering Foundation for its generosity in supporting this important series. Projects like *Design Squad* are critically important to maintaining WGBH’s mission of education, and your support has helped us take critical steps forward in launching *Design Squad Nation*’s new format and the Informal Pathways to Engineering initiative while continuing to reach diverse audiences with an innovative and engaging engineering and invention curriculum. WGBH is very grateful to UEF for its ongoing support, and we look forward to continuing this collaboration in the year to come.