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Cover Page Footnote

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Engaging Hard-to-Reach Audiences through Internal Interdisciplinary and External Diverse Collaborations

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Abstract. Through a combination of internal and external collaborations, consumer-based energy education designed for hard-to-reach audiences was successfully delivered statewide by an interdisciplinary Extension team. Program participants representing rural residents, senior citizens, and low-income audiences demonstrated improvements in knowledge and increased intention to change their home electricity usage behaviors. This outreach work can serve as a model for other Extension services to combine interdisciplinary teams with community partnerships to reach underserved audiences statewide.

INTRODUCTION

Extension Services are renowned for their ability to disseminate research-based information through diverse, developed networks. Leveraging this network, academic professionals at University of Illinois Extension formed the Smart Grid Outreach Team to develop and deliver consumer education about electric smart grid upgrades following the rollout of smart meter installation throughout Illinois.

Our team launched energy education programs in 2017 that engaged rural, low-income, and senior audiences because many suffer from a substantial energy burden (energy costs exceeding 6% of household income). Low-income families in Illinois spend approximately 13% of their income on energy costs (Elevate Energy, 2017); 50% of these households also experience energy insecurity, the inability of a household to meet its basic energy needs (U.S. Energy Information Administration, 2018). About 20% of households with residents aged 60 or older also experience energy insecurity (U.S. Energy Information Administration, 2018). However, implementing energy efficiency upgrades can result in 15% to 30% energy savings for a household (Elevate Energy, 2017).

In this report, we describe our program design, how we developed diverse collaborations, and how the Smart Grid Outreach Team has increased participant knowledge and intent to change energy behaviors. Our outreach work can serve as a model for other Extension services to combine interdisciplinary teams with community partnerships to engage underserved audiences in making energy efficiency upgrades, especially as smart grid upgrades are occurring nationwide.

PROGRAM DESIGN

Coupling research and evidence-based practices, our team developed a diverse array of energy programs to reach our intended audiences. Over four years, we received over $900,000 in grant funding from the Illinois Science and Energy Innovation Foundation. To reach diverse underserved communities statewide, we adapted educational content to include smart grid bingo at senior centers, Lunch-N-Learn programs at Meals on Wheels, interactive electric grid models for youth, and demonstrations of smart technology and simple residential energy efficiency upgrades. We also reached 100,000 Illinoisans with asynchronous education via radio, television, podcasts, social media, and information fairs. We designed our programming to help consumers understand how their electricity

reaches them, why a smarter system helps manage energy use, and how to improve home energy efficiency, with the goal of helping them save money and reduce demand on the electric grid.

DIVERSE COLLABORATIONS

Collaboration—both internally across Extension program areas and externally through community partnerships—maximizes available resources, expands access to specific audiences, and boosts public awareness of projects (Seevers & Stair, 2015; Stearns, 2018). Our team combined educators from two Extension teams: our energy and environmental stewardship educators developed and delivered educational programming using their expertise on energy efficiency, the smart grid, and renewable energy; our community and economic development educators connected energy educators to municipal audiences, delivered programming to senior citizen and local government audiences, managed the evaluation tool, and tracked where programming occurs.

Externally, we developed statewide collaborations with three other Illinois Science and Energy Innovation Foundation grant-funded organizations, whom we connected with at grantor networking meetings. Collaborating with the Smart Grid for Schools program (now called Smart Grid for All) at Illinois State University (a non-land-grant university), Seniors Independent Living Collaborative, and the Citizens Utility Board provided educational materials and expertise to improve our programming (Table 1). Recognizing youth as future decision makers, we used the Smart Grid for Schools hands-on miniature neighborhoods to teach youth how electricity is generated and flows through the grid. We also used these miniature neighborhoods to conduct power outage simulations with and without a smart grid (Figure 1).

Partnering with local groups already serving hard-to-reach audiences allowed our team to reach individuals who may not have attended a traditional Extension program (Bairstow et al., 2002). Our team developed the "Save Energy, Save Money" program to assist low-income participants to achieve financial savings through energy efficiency practices. Through partnership with C.E.F.S. Economic Opportunity Corporation, we delivered this interactive experience to participants of the Low Income Home Energy Assistance program, the Percentage of Income Payment Plan program, Meals on Wheels, and Head Start in central Illinois.

PROGRAM IMPACT

From May 2017 through December 2020, we delivered 175 programs statewide, reaching 4,660 participants through direct educational programming (Figure 2). We reached 3,620 adult participants and 1,040 youth participants.

Our partnerships with C.E.F.S. and Ameren Illinois, one of Illinois' major electric utilities, provided electric bill credits, home energy conservation kits, and residential energy efficiency upgrades to over 125 households (Figure 3). Combining incentives with educational intervention has been shown to shift consumer behavior to reducing residential energy usage (Kirby et al., 2015).

To evaluate program impact, we developed and distributed an IRB-approved retrospective evaluation to adult participants. The evaluation surveyed participants' knowledge of smart meters, likelihood to improve their home's energy efficiency and tell others about smart meters, and their current enrollment and/or interest in cost savings programs. Using a Likert scale of 1 (*very low/not at all likely*) to 5 (*very high/extremely likely*), participants ranked their knowledge and likelihood before and after attending the program. Evaluations without a paired response (before and after) were excluded.

Analysis of the evaluation results using paired t-tests assuming equal variances found that after attending the program, there was a statistically significant increase in participants' knowledge of smart meters and likelihood to improve home energy efficiency (Figure 4a). Additionally, there was a statistically significant increase in participants' likelihood to enroll in energy cost savings programs such as Peak Time Rewards and Power Smart Pricing (Figure 4b).

In 2019, University of Illinois Extension recognized our team's outreach work with an Interdisciplinary State Team Excellence Award and Ameren recognized our partnership with C.E.F.S. to increase energy efficiency engagement in underserved communities with an Energy Innovator Award.

Table 1. Summary of Internal and External Partners for Smart Grid Outreach

Type of collaboration	Local or statewide effort	Partners involved	Description of partnership
Internal	Statewide	- Five energy and environmental stewardship Extension educators - Three community and economic development Extension educators	Two University of Illinois Extension teams brought separate expertise and audiences to develop the Smart Grid Outreach Team.
External	Statewide	Illinois State University (ISU), Smart Grid for All (Schools)	ISU loaned the Extension team educational electricity kits for usage in local programs.
External	Statewide	Seniors Independent Living Collaborative (SILC)	SILC provided training on the benefits of smart technology for senior audiences and provided educational materials for the Extension team to use.
External	Statewide	Citizens Utility Board (CUB)	CUB served as a program delivery partner and a source of expertise to help answer Extension questions and provide educational materials.
External	Local	C.E.F.S. Economic Opportunity Corporation	C.E.F.S. provided home energy conservation kits, residential energy efficiency upgrades, and access to local low-income audiences, including participants of the Low Income Home Energy Assistance program, the Percentage of Income Payment Plan program, Meals on Wheels, and Head Start.
Internal	Local	4-H	4-H connected the Extension team with youth audiences for in-school and after-school workshops as well as conducted Welcome to the Real World simulations for eighth graders learning money management.

Figure 1. Smart grid for schools kit used for developing hands-on learning activities.

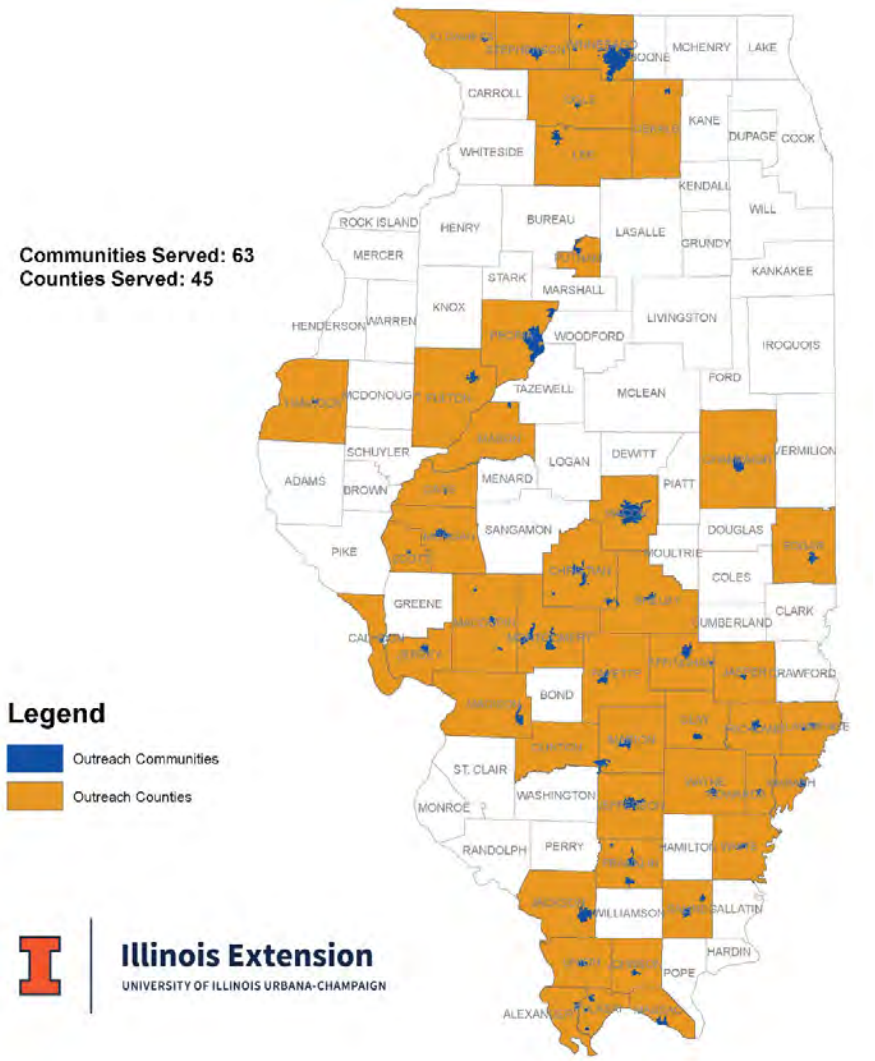

Figure 2. Map of counties and the communities within them receiving direct education from the smart grid outreach team.

CONCLUSION

By combining internal and external collaborations, programming designed for hard-to-reach audiences can be successfully delivered statewide, improving knowledge and increasing consumers' intentions to change their home electricity usage behaviors.

Following our successful engagement model (Figure 5), other Extension services looking to engage hard-to-reach audiences should consider:

- applying for grant funding from grantors supporting multiple agencies within a state and taking advantage of established networking opportunities to identify potential partners;
- finding multi-disciplinary collaborations within Extension to bolster their programming and introduce them to new audiences;
- leveraging Extension's ability to disseminate research-based information through extensive, diverse networks to find new community-based and statewide collaborators;
- synthesizing partner resources into a cohesive core message to be shared broadly; and
- integrating the core message into programming adapted to support local audience needs.

Figure 3. Home energy conservation kit. Adult program participants received an energy conservation kit containing LED light bulbs, an LED nightlight, an air filter whistle, and foam-insulating gaskets.

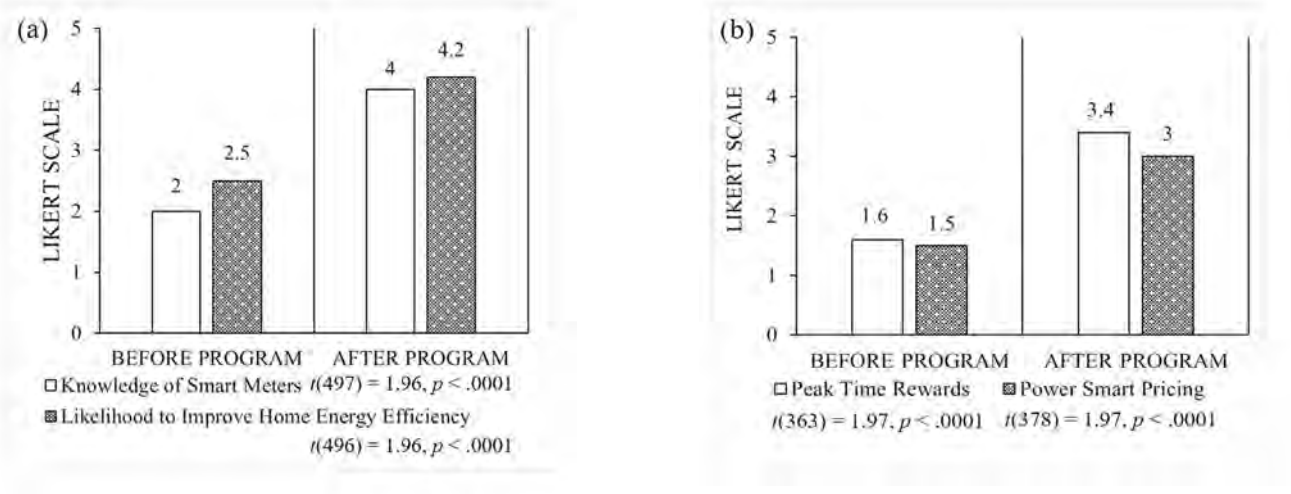

Figure 4. Retrospective evaluation analysis. Graph a shows participants' knowledge of smart meters and their likelihood to improve home energy efficiency. Graph b shows participants' likelihood to enroll in energy cost savings programs.

Figure 5. Model for engaging hard-to-reach audiences through internal and external collaborations.

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