

Wise Guys and Gals – evaluation update and plans

The major data collection and downloading period for WGG is late spring early summer. Data will continue to be collected and downloaded throughout May and June. Although data review and synthesis has been ongoing, these findings primarily have been used to refine the data analytic plans, generate new hypotheses and identify areas in which additional information is needed. During summer 2018, the data from the various sources and different modalities will be examined and synthesized, drawing conclusions and continuing to build knowledge. This data plan presents a general overview of what is planned for the next few months. For purposes of clarity the various data sources are discussed separately. Each will be studied deeply, followed by identification of cross-cutting themes and broad project findings.

WISEngineering/Student data: As part of each WGG activity, youth answer a variety of questions and record data in WISEngineering, the online platform that helps deliver the WGG activities. Youth input a wide variety of data at each point of the design process. Data may involve identification of information needed for the design challenge (e.g., about the specifications and constraints), recording of their work or observations (such as when they engage in testing a design), feedback about plans to redesign or revise their designs, or general reflections about the experience. Each activity has questions that are specific and meaningful for that particular activity. As a result, WGG activities differ by the number of questions youth should answer, the question formats, and even whether all parts of the design cycle have related questions. The evaluation team is currently finalizing the approach for looking within and across activities as well as over time as an indicator of growth in understanding of the initial stage of engineering design thinking.

CASE plans to examine four key areas

- Identification of the specifications and constraints
- STEM content knowledge as evidenced in correct answers to the Knowledge Skill Builders (KSBs).
- Completion rates as indicators of engagement
- Evidence of testing of their design through use of the various tasks within WISEngineering
- Evidence of an awareness of and thinking about redesign, particularly in response to the concluding question “How would you improve your design?”

A challenge using the WISEngineering data has involved access and coding of youth responses into a usable data matrix.

Facilitator Survey: Facilitators of WGG activities at each club have been asked to complete a survey about their experiences with WISEngineering, the WGG activities (including Shark Tank), WGG professional development and youth engagement/learning from the experience. The

surveys provide each facilitator with an opportunity to provide individual answers. The survey includes multiple choice and open-ended questions. Responses will be examined by question within and across clubs, and whenever possible questions will be grouped to develop a deeper understanding of the WGG experience. Since the number of data points is small (and completion is voluntary), most data will be treated descriptively, telling to story of WGG at the club.

Facilitator Interviews: Club facilitators are also being asked to participate in a group interview. (If scheduling prohibits a group interview, individual interviews are also possible). The interviews are just beginning to be conducted. Although estimated to last about 20-minutes, based on the once completed to date many will be much longer. The interviews will provide data about the club's approach to professional development, shark tank, activity preparation and delivery. Unlike the surveys that are completed individually, the interviews take a format more like a focus group, allowing for deeper exploration of topics as well as for new areas of study to emerge. The interviews are recorded and will then be transcribed. Underlying common themes will then be explored using qualitative coding method.

Club Leadership Interviews: The club directors and/or grants manager are interviewed separately. These interviews will probe WGG implementation in context with other programs, including how club leadership leverage their participation in WGG to more effectively serve the public or generally prosper in the informal educational sector. These data will help provide context for WGG. Once again, the interviews will be recorded, transcribed, and analyzed to identify underlying themes related to the goals of WGG.

WGG annual report: Every six months the clubs are required to submit data about their involvement in WGG, the number of youth engaged, and other questions related to planning and delivery. These reports include both descriptions of the WGG experiences as well as quantitative data about delivery. The reports are coded and the data entered into a WGG club-level database.

National Youth Outcomes Initiative (NYOI) Survey: In 2016, BGCA added STEM-related items to the NYOI, their annual Club Member Survey administered at approximately 2,700 BGCA sites to more than 170,000 youth. These surveys includes questions about behavioral and psychological constructs as well as STEM-related items related to interest, identity, efficacy, and career knowledge. In quasi-experimental fashion, CASE hopes to access the aggregate club data and compare these data to the overall national data.

Data analyses and evaluation work plan

Data analysis and evaluation work plan: summer 2018

The evaluation team will prepare updates as the data are studied. By the early August, 2018 it is anticipated the following evaluation work will be completed and a written update available of findings to data available.

- **WISEngineering/youth data:** Data will be cleaned and coded as appropriate using rubrics already devised by CASE. Data will then be input into statistical software. Initial descriptive analyses will be completed. These will include summaries by club, by activity and overall for key variables such as the number of attempts needed to identify specifications and constraints; evidence of STEM content knowledge as indicated by correct answers to the Knowledge Skill Builders (KSBs); completion rates (an indicator of engagement); and evidence of youth testing of their design through use of the various tasks within WISEngineering. Qualitative data, (e.g., responses to the question “*How would you improve your design?*”) will be cleaned and prepared for content analysis. Preliminary coding themes identified based on initial review of the data and project framework/theory.
- **Facilitator Survey:** Data will be cleaned and input into statistical software. Initial descriptive analyses will be completed, including summaries by club, by activity and overall. Qualitative data will be reviewed and preliminary coding schemes identified.
- **Facilitator Interviews:** Interviews will be completed the end of June. Interviews then will be transcribed and initial reviews undertaken to identify major reoccurring themes. The data will be ready for content analysis.
- **Club Leadership Interviews:** Interviews will be completed the end of June. Interviews then will be transcribed and initial reviews undertaken to identify major reoccurring themes. The data will be ready for content analysis.
- **WGG annual report(s):** These data are analyzed as submitted. Annual reports from multiple years will be reviewed and relevant information identified. Data will be quantified and entered into data matrix. Qualitative data will be coded and entered into matrix
- **National Youth Outcomes Initiative (NYOI) Survey:** We are unclear if these data will be available by June 30, 2018.

This plan is conservative, and it is expected that more may be accomplished. The goal is to explore evidence of project outcomes and begin to identify lessons learned. After extensive data cleaning, the first analyses will examine trends within individual data sets, whenever possible exploring differences between clubs and/or activity. The next step will be to look for common themes across data sources. These themes will then guide development of a revised theory of action for WGG. The intent is to then develop a dissemination plan for sharing the research findings and lessons learned.