Formative Evaluation of a STEAM and Nutrition Education Summer Program for Low-Income Youth

Jacquelyn Potvin[1], Kelsi Chappell[1], Kate Balestracci[1], Geoffrey W. Greene[1], Sara Sweetman[2], Sarah Amin[1]

[1]University of Rhode Island Nutrition & Food Sciences Department, [2]University of Rhode Island Education Department

Summary

Project Science and Technology Reinforced by Innovative Dietary Education (Project stRIde) aims to provide a science, technology, engineering, arts, mathematics (STEAM) and nutrition education curriculum to low-income, racially and ethnically diverse, incoming 5th and 6th grade youth. A formative evaluation of Project stRIde was conducted from May-July 2020 to gain insights from expert content reviewers and identify revisions before piloting. This study was conducted in the first year of a 5-year USDA Children, Youth, and Families at Risk (CYFAR) grant.

Objective

To conduct an expert content review (ECR) of the Project stRIde curriculum to assess the content, cultural sensitivity, feasibility, and curriculum standard adherence to inform revisions to the curriculum.

Methods

- Project stRIde curriculum was developed by two nutrition educators and a 6th grade science teacher.
- The curriculum consists of six weekly, 1.5-hour lessons designed to align with U.S. Common Core and Next Generation Science Standards for 5th and 6th grade.
- Nine experts from the fields of nutrition education, cultural competency, elementary education, summer youth programming, and STEM outreach were recruited as an expert review panel for the ECR.
- Each expert completed a 63-item online survey with open- and closed-response items followed by a one-hour virtual interview.
- The closed- response survey items were scored using a 4-point Likert scale and are expressed as means (possible range= 1-4).

Methods

- Virtual interviews were transcribed and a codebook was established using both inductive and deductive approaches based on information from expert surveys.
- Inter-rater reliability (IRR) was determined by two team members after which one team member coded the remaining transcripts using NVivo (Release 1.3.2).®

Results

IRR for the two coders yielded an unweighted kappa value of 0.83. Seven core themes were identified from the expert review panel's surveys and interviews. All nine experts completed the survey and interview, stating that the lessons were accurate, incorporated STEAM concepts, and were culturally appropriate, among other feedback.

Table 1: Means of Likert Scale Scores from Expert Content Review Survey

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6
Learning Objectives Addressed	3.56	3.56	3.89	3.78	3.56	3.67
Lesson Activities Relate to Learning Objectives	3.67	3.56	3.78	3.47	3.69	*
Material Adequacy for 5th Grade Level	3.78	3.33	*	3.22	*	
Material Feasibility for Time Frame	3.22	3.22	3.56	3.50	3.33	3.67
Incorporation of STEAM Concepts	3.78	3.78	3.78	3.78	3.78	*
Lesson/Material Accuracy	3.67	3.78	3.78	3.67	3.78	*
Variety of Teaching/Learning Strategies Used	3.56	3.78	3.78	3.40	3.78	3.67
Cultural Appropriateness	3.44	3.33	3.67	3.67	3.56	3.56

Note: Likert scale responses ranged from *1=Strongly Disagree, 2=Disagree, 3=Agree, 4=Strongly Agree*
*Question not asked about this lesson on survey because lessons were adapted from previously used activities, or this lesson does not introduce any new material, mean score and standard deviation not provided

SNEB Nutrition Educator Competencies Addressed: 8.7, 8.8, 8.10, 8.11, 10.1

Results- Themes

- Effectively Promoting Youth Engagement
- Increased Lesson Guidance or Support Needed
- Activity Difficulty for Age
- Time
- Confidence in Teaching Lessons
- Cultural Appropriateness
- Strengths of Curriculum in Promoting STEAM Education and Innovation

"I think some of the staff who are newer, or maybe not as experienced, may be a little overwhelmed by the amount of stuff that needs to be put into it. **Some people will be great. Others may need some support."**

"I think that the biggest red flag that I noticed would be the time. It seemed like you wouldn't have enough time to do most of the activities."

"I thought that, overall, the curriculum was excellent. I think that the kids will really enjoy doing a lot of the activities. **They were engaging**. **They were hands-on**."

Conclusion

- The diverse expert review panel provided useful and relevant feedback to inform curriculum changes, specifically revisions related to time, student engagement, cultural inclusivity, and activity age-appropriateness.
- Formal, in depth formative evaluations are not commonly performed, but should be included to strengthen program delivery.

Acknowledgements

This work is supported by USDA CYFAR Award #2019-41520-30048 from the USDA National Institute of Food and Agriculture.