ABSTRACT

Addressing Diversity in Planning, Implementation, and Evaluation of STEM Programs
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For decades, Americans have witnessed an achievement gap between our students of color and low socioeconomic status when compared to middle class and white students. This phenomenon is particularly disturbing when considering the importance of science and technology to the world economy. According to Kane (2008)

- America now ranks 24th in science literacy and 26th in math literacy on a list of the top 40 most industrialized nations.
- The federal government has invested over $3 billion to increase minority participation in STEM.

Therefore, we propose that the following steps in preparing original statements: is the statement grammatically correct? Does the statement contain the focus concept? What does the statement mean?...statement separately. The new list of statements from the one original statement is:.

- STEP 1: Objectives in planning, implementation, and evaluation of social and education programs to... is...
- STEP 2: Does statement represent culturally sensitive behaviors to be culturally responsive in planning, implementation, and evaluation of social and education programs to...
- STEP 3: Does either statement represent culturally sensitive behaviors to be culturally responsive in planning, implementation, and evaluation of social and education programs to...

METHODS

PROCEDURE

Preparation for concept mapping

Initial preparation of the concept mapping exercise included generation of the focus statement. The focus statement is a statement intended to capture brainstorming ideas relevant to the focus of the concept mapping study. In this project, the intent of the concept mapping study was to capture a set of ideas and principles that evaluators and staff use in their evaluation of STEM programs.

Focus statement: "One specific thing I do to be culturally responsive in planning, implementation, and evaluation of social and education programs to..."

Generating the ideas:

- Participants invited to participate via email containing a link to the website.
- Responded to 7 anonymous demographic questions.
- Unlimited time to respond to the focus statement by completing the statement.
- Could list as many ideas as desired.

ANALYSIS

The analysis consisted of five steps:

1. Identifying compound statements and separating them into distinct statements.
3. Reducing the statement set to 124 to 100.
4. Performing a keyword in context analysis to find key words, and terms.
5. Using keywords to extract themes from the set of statements.

The original statement set consisted of 93 responses from 48 participants became 123 statements when compound ideas were disaggregated.

We performed a keyword in context analysis, using ATLAS.Ti Concordance Software (Kane & Trochim, 2007), to identify keywords that were used several times in the response set and the statements in which each keyword was used. In this way several keywords were identified (i.e. research, include, cultural, etc.). Researchers then identified each statement linked to a keyword and derived the key themes based on the analysis of each keyword in context and the meaning of all statements linked to each keyword. A similar analysis of the extent literature on culturally responsive evaluations, in general, was conducted in order to compare and contrast respondent statements with key ideas in the literature.

RESULTS

A review of the literature on CRE revealed several principles that can guide culturally responsive program planning and evaluations. However, though the principles are helpful, they are also generic statements of what an evaluator/program planner should try to do without a specific mechanism of how to apply each principle practically.

- The preliminary data collection in this project serves to:
  - enrich principles and theories in the literature with behavioral examples of how theory about cultural responsiveness translates into action.
  - provide an example of how literature analysis can be used to inform the development of a culturally responsive evaluation framework.
  - consider the need for specific guidelines on how to apply the principles.

It also serves as a preliminary step in creating a conceptualized list of actions that can operationalize culturally competent behaviors for practical implementation (i.e. a checklist) in an accessible and distributable manner. 

There are clear themes in the literature on evaluation regarding culturally diverse populations. However, these themes are usually globalized, abstract principles rather than concrete, operationalized behaviors. There are many instances in the literature of highly specific examples on how evaluations are conducted in a particular context. However, this type of information is not consolidated and does not always have relevance to different programs working with various populations. The data from this study is directly gathered from individuals working in STEM fields and provides more specific examples of behaviors.

Future Directions

A series of future studies have been designed as extensions of this work:

- Study 1
  1) To what extent do practitioners perceive each of the principles and behaviors compiled in the pilot study as feasible and important to CRE?
  2) To what extent do these consistent use of language and methods in CRE?
- Study 2
  1) Will a student perspective provide more concrete behaviors to supplement the generalized principles drawn from the literature and program staff/evaluators?
  2) What percentage of students from a STEM pipeline program such as Tech-PREP...
- Study 3
  1) Determine the extent to which students receiving the benefits of STEM programs are able to...