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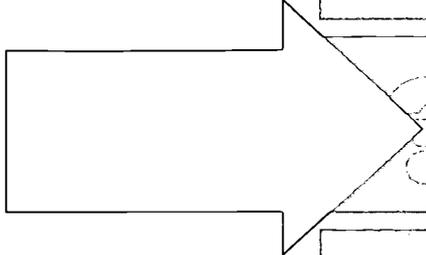
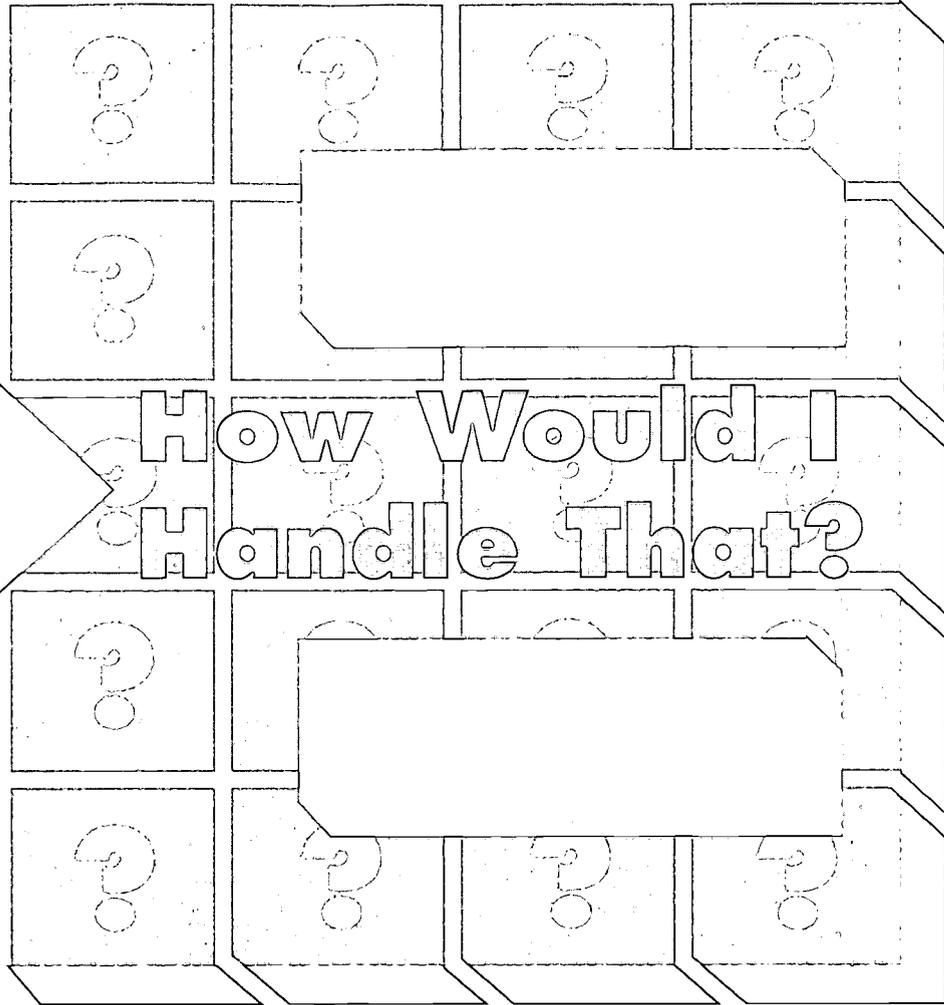
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ABSTRACT

Knowledge of theory, of research, and of potential strategies is an important component in any educational equity effort. Unless these kinds of knowledge can be applied to specific situations, they are of little "real life" value. The use of vignettes may help. A vignette is a short story without an ending that presents an issue. The major purpose of a vignette is to serve as a springboard for discussion and arriving at possible solutions to the issue raised in the vignette. Responding to vignettes individually or in small groups can be an effective way to experiment with ideas, build on the ideas of others, and work toward consensus in a nonthreatening manner. The goal of this pamphlet is to provide an introduction and encourage the use of vignettes. In addition to defining the term "vignette" in the context of equity, the steps involved in constructing vignettes are also described. This includes developing situations that are realistic and relevant for the intended audience. A series of vignettes addressing educational issues related to math, science, and equity is also provided. (PVD)

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Using Vignettes to Promote Good Math and Science Education

Patricia B. Campbell, Ph.D.

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The Collaboration for Equity: Fairness in Science and Mathematics Education seeks to ensure that the efforts to reform math and science education improve quality for all while decreasing the historical gaps in participation and performance between groups. The focus is on girls and women — of all colors, backgrounds, and abilities — but the benefits of the project will accrue to all groups.

Funded by the National Science Foundation, the project is a partnership of the American Association for the Advancement of Science (Yolanda George and Eva M. Gavillán, Ed.D.), Education Development Center, Inc. (Ellen Wahl and Eric M. Jolly, Ph.D.), Campbell-Kibler Associates, Inc. (Patricia B. Campbell, Ph.D.), Nancy Kreinberg (founding director of EQUALS) and Girls IncorporatedSM (Heather Johnston Nicholson, Ph.D.). Beatriz Chu Clewell, Ph.D. of the Urban Institute serves as the project evaluator.

The Collaboration works with policymakers, leaders of reform efforts, educators, researchers, and equity advocates to translate what equity means into concrete strategies and actions. Products include tools for monitoring the equity impact of reformed practices and policies, materials that make the case for the link between equity and excellence, summaries of research about equity in mathematics and science, analyses of data on enrollment and achievement, and meetings to mobilize the educational community to embrace equity of outcome as a measure of success.

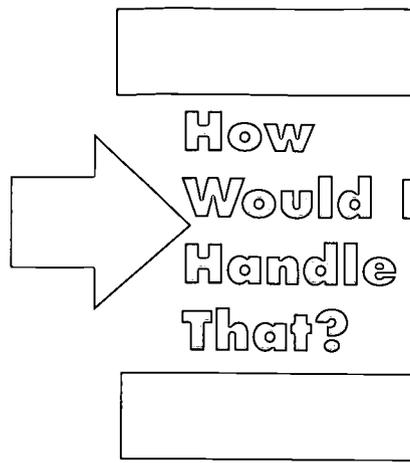
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Using Vignettes to Promote Good Math and Science Education

Patricia B. Campbell, Ph.D.

INTRODUCTION

Knowledge of theory, of research, and of potential strategies is an important component of any educational equity effort. However, unless these kinds of knowledge can be applied to specific situations, they are of little “real-life” value. Yet the political and pedagogical complexities of “real-life” situations are often overwhelming. Too, real schools with real children tend not to be the best places to develop the skills necessary to move from theory to practice.

The use of vignettes may help. Vignettes are short stories that are written to reflect, in a less complex way, real-life problems of education and of equity. Responding to vignettes, individually or in small groups, can be an effective way to try out some ideas, build on the ideas of others, and even work toward some consensus in a relatively nonthreatening manner.

The goal of this pamphlet is to provide an introduction to the use of vignettes and to encourage people to use them. The pamphlet also provides a series of vignettes dealing with educational issues related to math, science, and equity.

WHAT IS A VIGNETTE?

A vignette is a short story without an ending. It is short, but not too short to present an issue. It is detailed, but not so detailed that the underlying issue gets lost. A vignette presents an issue, such as the underrepresentation of girls in advanced math courses, in a context with which individuals can identify. A good vignette:

- has fewer complexities and personalities than real life.
- sets up a situation in which there is no one “right” answer.
- is flexible enough that individuals from different groups (teacher/administrator, female/male, liberal/conservative) can identify with the story and bring their perspective forward in discussions of solutions.

The major purpose of a vignette is to serve as a springboard for discussion. To be most useful, the discussion should focus on solutions to the issue being raised in the vignette. Vignettes should provide people with an opportunity to try out ideas and build on the ideas of others with a specific issue in mind. Hopefully, the discussions will help participants find better solutions to the equity problems facing math and science education, as well as providing participants with a positive learning experience.

CONSTRUCTING VIGNETTES

There are three major steps to making up vignettes:

1. Determining issues or areas of concern for those who will be using the vignettes.
2. Developing situations that are realistic and are relevant for those who will be using them.
3. Testing the vignettes with groups similar to those who will be using them to ensure that the vignettes are clear and do provide people with an opportunity to deal with the issues you intended them to.

The following provides a sample process for developing a series of vignettes. While the developer begins the process with a general area in mind—in this case equity, in math and science education—the most useful vignettes are those which are tailored specifically to the groups who will be using them. Representatives of those groups can help the developer get a better idea of specific situations and issues related to the general theme.

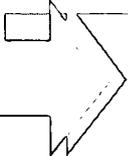
For example, many of the vignettes included here were written for administrators involved in math and science education reform who were also concerned about math and science equity in their states. To develop vignettes based on this general area, a sample of these administrators were surveyed as to what they felt were the biggest barriers or issues related to making math and science better and more equitable.

Areas that came up in the survey included:

- how to have representatives from different equity groups work together toward a common goal.
- how to make equity a key component in reform efforts.
- how to provide teachers with specific, effective things that they could do in their classrooms.

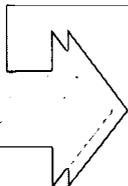
Vignettes were then designed to cover these areas. The following vignettes were among those that were crafted:

You are a guest speaker at a retreat that has brought together educational policy makers and equity advocates. The equity advocates are discussing the importance of equity in mathematics and science! But the discussion is getting quite heated. Race, gender, and disability advocates are all pushing for their issues to be addressed, and a bit of competition is going on as to which group is MOST underserved. It's becoming quite overwhelming, and some of the policy makers are beginning to look very nervous. You are next on the agenda.



What can you do?

You are at a large, important State Systemic Initiative (SSI) meeting for your state, including your state's new chief state school officer. In the opening speech, he announces that there are no special interests in the new educational program: "Our state reform effort is for all students, and all students will succeed in mathematics and science regardless of their gender and race." He goes on to explain about the need to look at and help students as individuals—not as girls or boys, or as African-Americans or whites. There is a great deal of applause at the end of his speech. You, the SSI equity specialist, are on next.

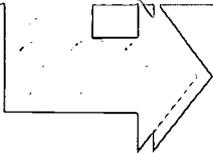


How do you respond to him in your presentation? What do you do after the meeting?

Because strategies that work in some types of schools don't work in others, some vignettes need to be set up to take place in urban districts, others in rural and suburban districts. Because issues are different in elementary and secondary schools, some vignettes should deal with younger students, others with older students. Vignettes covering the same issue need to be different, based on the population being addressed. For example, vignettes covering possible inequitable impacts of some reform efforts would be written differently based on the targeted population.

If the targeted group deals with elementary school teachers or students, the vignette might be as follows:

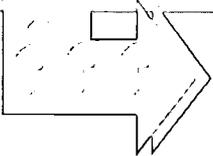
Teachers worry about equity implications of recent reforms in mathematics, but have little idea about what to do. For example, elementary school teachers are concerned that the increasing emphasis on problem solving and the decreasing emphasis on computation and rule-based mathematics will further turn girls off to mathematics.



What should you do?

If the targeted group deals with secondary students or teachers, the vignette might be:

Teachers worry about equity implications of recent reforms in mathematics, but have little idea about what to do. For example, calculus teachers are concerned that the increasing emphasis on graphics calculators will turn more girls off calculus.



What should you do?

Responses would also be quite different, depending on who the “you” is. For example, the “you” could be a teacher, a department chair, or a curriculum developer. The “you” needs to be defined. “You” could be whoever is reading the vignette and participating in the discussion. A second option is to give each person in the discussion group a specific role—teacher, principal, researcher, or outside equity advocate.

Often, vignettes are designed for a specific population—teachers, parents, administrators, policy makers, advocates—to use. Vignettes can also be designed so that representatives from different groups—for example, policy makers and parents—come together to discuss the vignettes and work toward solutions together. This has the advantage of having the perspectives of multiple groups in the search for solutions.

SAMPLE VIGNETTES

The following are some sample vignettes and suggested target groups:

SUGGESTED TARGET GROUP: Everyone

There has been a tremendous amount of discussion about educational equity and equitable and inequitable classrooms. Everyone talks about it, but few say what it is.

What is an equitable classroom? How can you tell whether a classroom is equitable?

SUGGESTED TARGET GROUP: Pre- and In-service Teachers

The National Council for Teachers of Mathematics Standards recommends doing small-group work. Teachers worry that boys might tend to dominate small groups and might also do the more meaningful tasks and relegate girls to more secretarial tasks.

How do you ensure that this doesn't happen?¹

The National Council for Teachers of Mathematics Standards recommends that mathematics be situated in problem-solving contexts. Many such contexts with which teachers are familiar are from male-dominated fields (e.g., surveying for trigonometry, sports for statistics).

How do you ensure that problem contexts reflect the interests of both girls and boys?²

After checking your own behavior, you discover that students are getting different amounts and types of attention from you, based on their gender and race. In general, boys are getting more positive and negative attention from you than are girls, with African-American boys getting the most negative attention.

What, if anything, do you do? Why did you decide to respond in this way?

¹ Thanks to Dr. Elizabeth Fennema for this vignette.

² Ibid.

In a parent conference, Doreen's parents say it really isn't that important for Doreen to do well in math. After all, Louella, Doreen's mother, has always hated math, and it never affected her life negatively.

What, if anything do you do?

Why did you decide to respond in this way?³

In the following vignette, one or more groups would do Vignette A, and one or more groups would do Vignette B. Then the groups would get together and discuss the similarities and differences in their responses and the implications for their teaching.

VIGNETTE A

Adrienne is not the best math student in the world, but she does try. She has been working on this one problem on dividing by fractions (What is $1/2$ divided by $1/4$?) for what seems like forever and has come to you for help.

Please describe what, if anything, you do to help her.

VIGNETTE B

Mason is not the best math student in the world, but he does try. He has been working on this one problem on dividing by fractions (What is $1/2$ divided by $1/4$?) for what seems like forever and has come to you for help.

Please describe what, if anything, you do to help him.⁴

³ Adapted from earlier work by Dr. Patricia B. Campbell developed for the Teacher Education Equity Project.

⁴ Ibid.

*SUGGESTED TARGET GROUP: Equity Advocates from Either
The School or The Community*

You have found some interest in gender and race equity issues in mathematics and science among teachers and department heads within a large suburban district, but little interest among district administrators and school board members. There is a strong feeling that, while equity is a good thing, other issues, including serious budget cuts and work on reform within the SSI, are much more important issues. Administrators and the school board have made it clear that they will support an equity workshop, but beyond that, you are on your own.

You need to bring issues of gender and race equity in mathematics and science to the table and get those with the resources and influence to hear what you have to say. You need more than just a few head nods; you need action taken.

How do you bring equity to the forefront?

What do you want from the board, the superintendent, and other administrators? How do you get it?

How would your responses be different if the district were an inner-city district?

Science and mathematics teachers at De Witt Clinton High School feel that they have “done” equity. They have attended an in-service program and learned that there are fewer girls than boys in advanced mathematics and science courses and that gender differences are still great in science- and mathematics-related careers. They have heard about differences in the ways teachers treat girls and boys. However, they are pretty sure that they treat all students equally and that girls and boys are freely choosing the courses and careers that they want. One of the algebra teachers took an EQUALS course and has talked about it to other teachers, but there hasn’t been much interest among faculty members. You have collected data from the school and know that there is a problem—that only about 30% of the students in calculus are girls and, while few students of either sex take physics, almost none of them are girls. The principal is willing to support you, but has no idea of what to do.

What do you do?

SUGGESTED TARGET GROUP: Policy Makers

Several suburban public schools in your state have instituted voluntary all-girl math classes at the high school level. While there has been no controlled research on the impact of the classes, most of the girls and their parents like the classes a lot and feel that they are improving the girls' math skills. With the help of a national organization, several boys from one of the districts are threatening to sue the district and you for a violation of Title IX.

What do you do? How would you rationalize your decision to have the all-girl classes?

To try to reduce the dropout rate of African-American boys and to increase their involvement in science, teachers at a large urban high school in your state have established the "Charles Drew Science Club." Targeted toward African-American boys, the club involves tutoring and role models. It provides the boys with science mentors and trips. The club appears to be working. The families of several girls in the school are very upset about their daughters not being encouraged to be in the club.

What do you do?

As part of your efforts to improve math and science education, you have eliminated tracking in math and science courses. The research results indicate that students who would have been in the lower tracks are doing better than they did under tracking and students who would have been in the upper level tracks are achieving at about the same level as they did under tracking. Parents of the formerly upper-level tracked students are furious that tracking has been abolished. They feel their children are being damaged and want tracking reinstated NOW. They have organized and are pressuring you a great deal.

What do you do?

SUGGESTED TARGET GROUP: Administrators in Math and Science Reform Efforts

There is a tremendous body of research on gender equity issues in mathematics and a growing body of research on gender issues in science, although not very much of the research deals with the interaction of gender and ethnicity. Teachers don't want to hear about research results; they want something that will work with their students.

How do you go about translating that research into practice?

What do you do about the lack of information dealing with girls of color and girls with disabilities?

SUGGESTED TARGET GROUP: School Administrators

Under your direction, your high school has instituted voluntary all-girl math classes at the high school level. While there has been no controlled research on the impact on the classes, most of the girls and their parents like the classes a lot and feel that they are improving the girls' math skills. A national organization is threatening to sue the district and you for a violation of Title IX.

What do you do? What arguments would you use to justify your decision?

Working with your local urban systemic reform effort, you have been encouraging teachers to rethink their teaching to be more in line with math and science standards. Teachers are interested, but they are also aware that change is hard and that there is a learning curve. While they can see the benefits of some of the changes, they also are aware that, as they learn to apply the new ideas, their teaching may not be as good or as effective as it has been. They are concerned about their evaluations as they try new modes of instruction.

You want to encourage teachers to change, but you also want to keep them accountable.

What do you do?

There are currently no girls on the math team and during last year's science fair only 20% of the prizes were won by girls. Teachers say that they are encouraging the girls to participate, but the girls don't want to.

What do you do?

SUGGESTED TARGET GROUP: Researchers

You are an advisor in an effort to revise a national standardized test to better reflect the mathematics skills of girls. The research indicates that if more items dealing with algebra are added and the number of items dealing with mental rotation are reduced, gender differences will decrease. However, racial differences will increase. Basically, psychometric efforts to decrease the gender difference in the national standardized test increase the racial differences.

What do you do?

COLLABORATION FOR EQUITY

Fairness in Science and Mathematics Education

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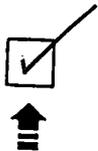
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