Journeying Across Borders in the Science Classroom:

Do culturally relevant teaching/learning materials have a place?

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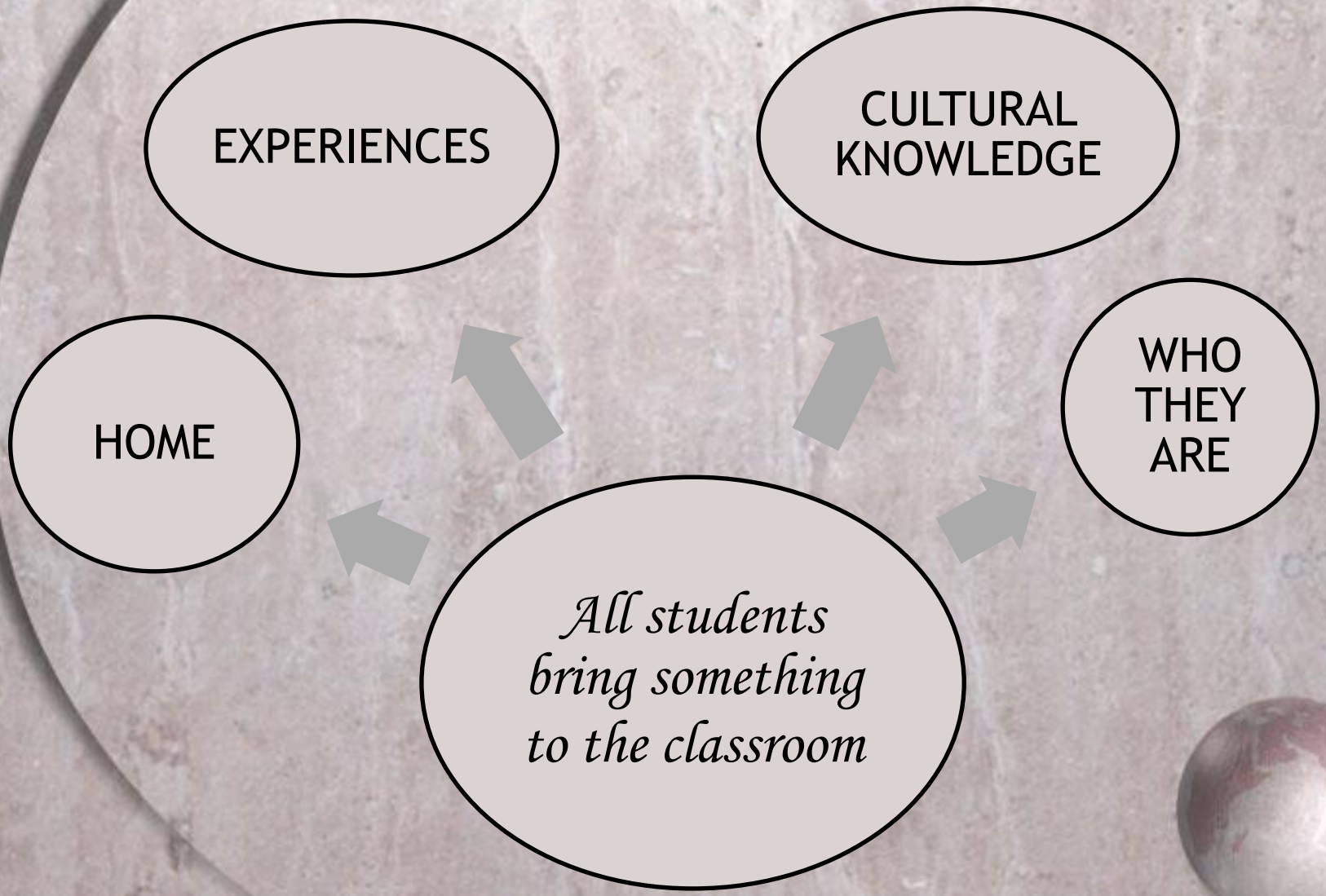
WHAT ARE STUDENTS REALLY BRINGING INTO THE CLASSROOM?

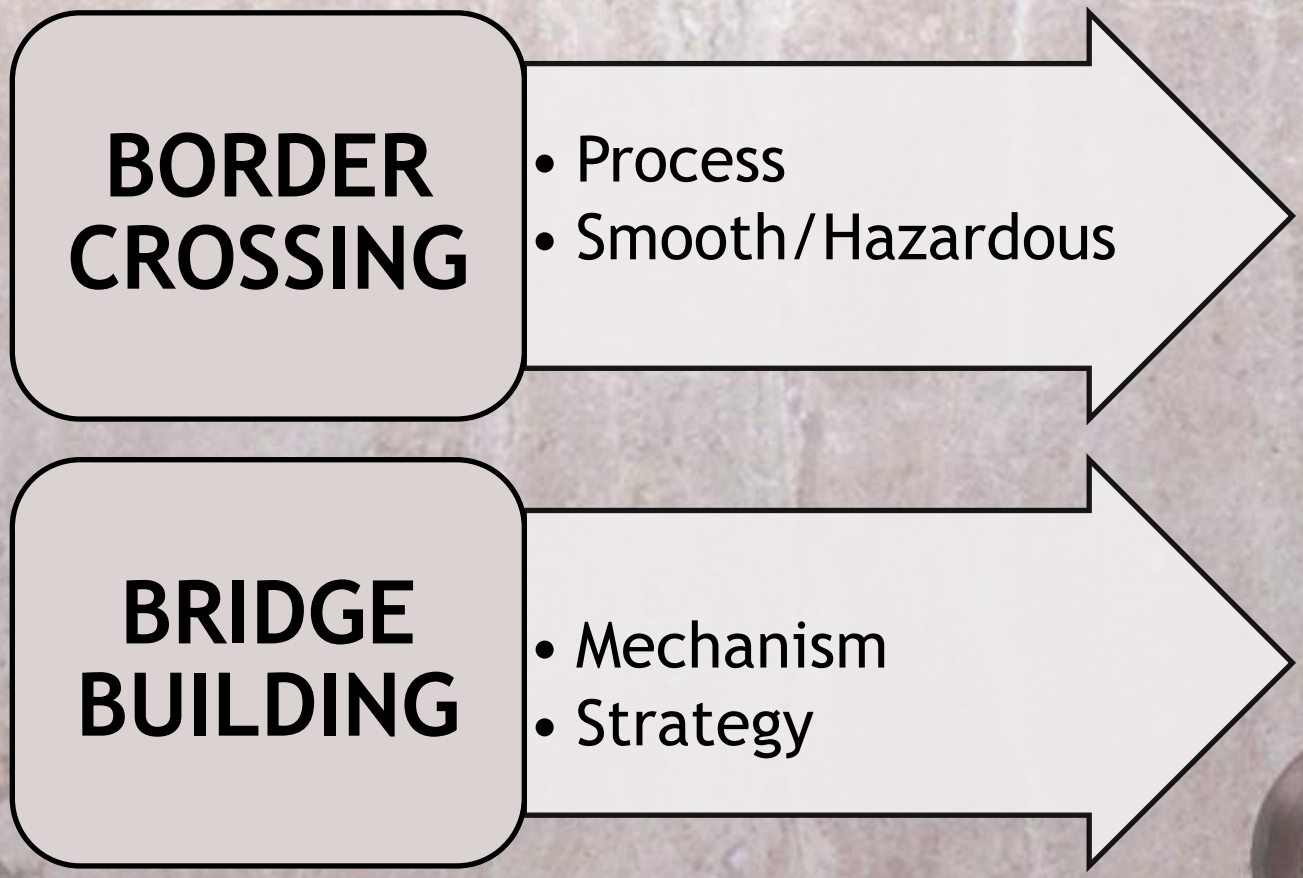


IS SCIENCE TRULY ANOTHER WORLD?

- A student's worldview can be thought of as the point of cognitive origin.

- Worldview: "The culturally dependent, implicit, fundamental organization of the mind…worldview provides a person with presuppositions about what the world is really like and what constitutes valid and important knowledge about the world" (Cobern, 2000)

BORDER CROSSING THROUGH BRIDGE BUILDING



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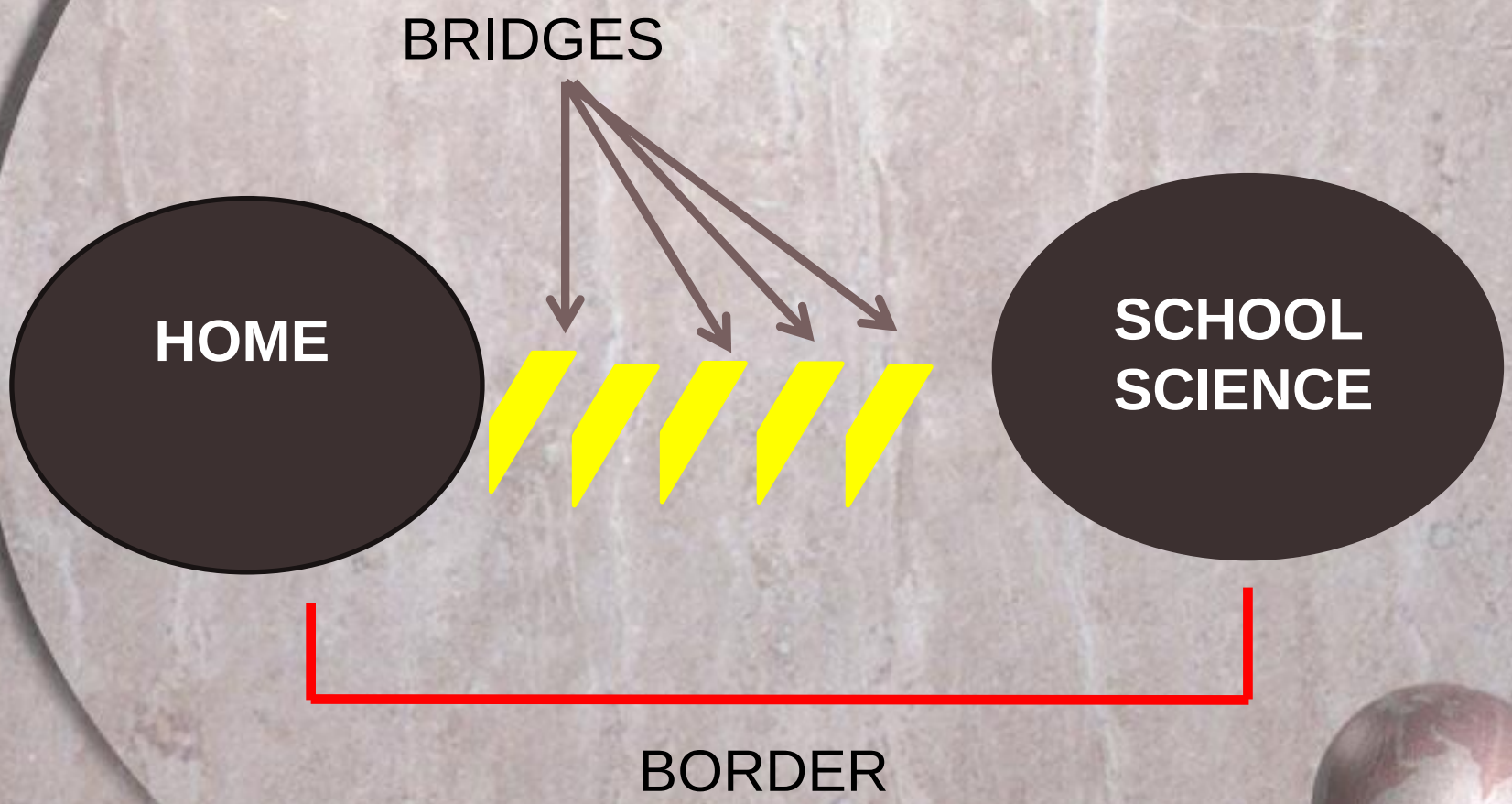


CULTURALLY RESPONSIVE TEACHING AS A BORDER CROSSING DEVICE

- Culturally responsive teaching:
  - Promotes Learning
  - Utilizes students' real life experiences
  - Increases motivation
  - Reduces resistance to school science
  - Increase interest

Gay (2000), George (1999), Aikenhead (1997)

GOAL OF PROJECT

- To help students access conventional science
- To make students aware that there are cultural practices that deal with some of the same content areas that are dealt with in conventional science
- To infuse these practices/beliefs into the lessons as a bridge for accessing conventional science

DESIGNING THE STUDY: The Process

- Permissions obtained (administrative and parental)
- **Student interviews**: collect information on their worlds outside school as well as access what cultural knowledge they possess

- Conduct of unit of work containing culturally relevant material
- **Direct observation** of participants during application of unit of work

- Weekly in depth interviews (for 3 weeks) with each participant and collection of physical artifacts (student work, drawings, explanations) during the application of the unit of work
- Administration of **Post Unit test**

LESSON DESIGN

Ideas from students about how sickness is caused

WHAT THE STUDENT KNOWS

Traditional ways of dealing with vectors

BRIDGE BUILDING STRATEGY:
Mapping general statements about causes of sickness from the cultural knowledge provided unto specific scientific concepts and principles

Describe how diseases are caused

CONVENTIONAL SCIENCE CONCEPTS

Explain the role of vectors in the transmission of disease

Compare different types of disease causing organisms

Lesson Title	Mode Of Infusion	Specific Cultural Knowledge Utilized	Expected Ways In Which Bridges Would Be Utilized	Section Of Lesson Where Cultural Knowledge Was Infused
"I'm Sexy and I know it!" Health and categories of disease	Visual materials (pictures) and discussion	- Pictures of individuals with whom students are familiar - Discussion on personal experience with disease (friends or family members) - Discussion on acceptable views of body image in their community	(a) Students should critically reflect on what they consider to be a healthy person, drawing on their cultural knowledge and use the outcome of this reflection in coming up with a definition of health (b) Students should draw on everyday experiences of people with diseases with which they are familiar and utilize this to generate a list of diseases that can be	Set Induction Development (Activity 1)

Lesson Title	Mode Of Infusion	Specific Cultural Knowledge Utilized	Expected Ways In Which Bridges Would Be Utilized	Section Of Lesson Where Cultural Knowledge Was Infused
Maintaining Health: Our body, our environment and our science	Visual materials, discussion and questioning	Through discussion and questioning interrogating by students of: - Sayings (from data base) about how we get sick - Traditional ways of maintaining good health - Sayings about blood and our body - Bush medicines for sickness	Students should utilize sayings concerning the maintenance of health in order to stimulate further discussion and also to allow them to weigh pros and cons of each scenario	Set Induction Development (Activity 1) Consolidation (Activity 4)

MEET ALICE

- Alice was a sub-study within a case
- Form 4 Biology Class within **'Red School'**
- Alice showed characteristics that many underperforming science also displayed.
- She was unmotivated and uninterested in science.
- Another reason Alice was chosen for this study was because she had over 80% attendance to science classes and is normally willing to share her ideas or concerns openly.

MEET ALICE

“ Sometimes science just does not make sense. There is nothing to make it [science] stick, by the time that bell ring, and it gone…I am just lost. Right through. Lost.”

MEET ALICE

The study was guided by the following questions:

- What use did Alice make of teacher constructed bridges?
- What bridges did Alice construct on her own using cultural knowledge?
- What is the efficacy of the border crossing process when cultural knowledge is used to build bridges?

ALICE AND THE WONDERLAND EXPERIENCE: Findings

Three major themes were identified:

- **Successes**: Instances within Alice's interviews and mind maps where she indicated feelings of satisfaction or increased interest. Teacher-constructed bridges were successful.

- **Challenges**: Instances where Alice had difficulty utilizing bridges provided. When faced with these challenges Alice would become dismissive and distracted. Teacher-constructed bridges were unsuccessful

- **Conflicts**: Instances where Alice encountered dilemmas between her cultural knowledge and conventional science.

SUCCESSES

Use of Teacher Constructed Bridges

In Lesson Four, the bridge building strategy involved students utilizing their familiarity with HIV/AIDS in order to understand conventional scientific explanations about HIV/AIDS. During this class, Alice was noticeably vocal, giving several scenarios and stories about people she knew with HIV. This enhanced the classroom discussion as I had anticipated.

Student Constructed Bridges

Personal experiences VS use of sayings

Reflection and personal experiences VS use of media

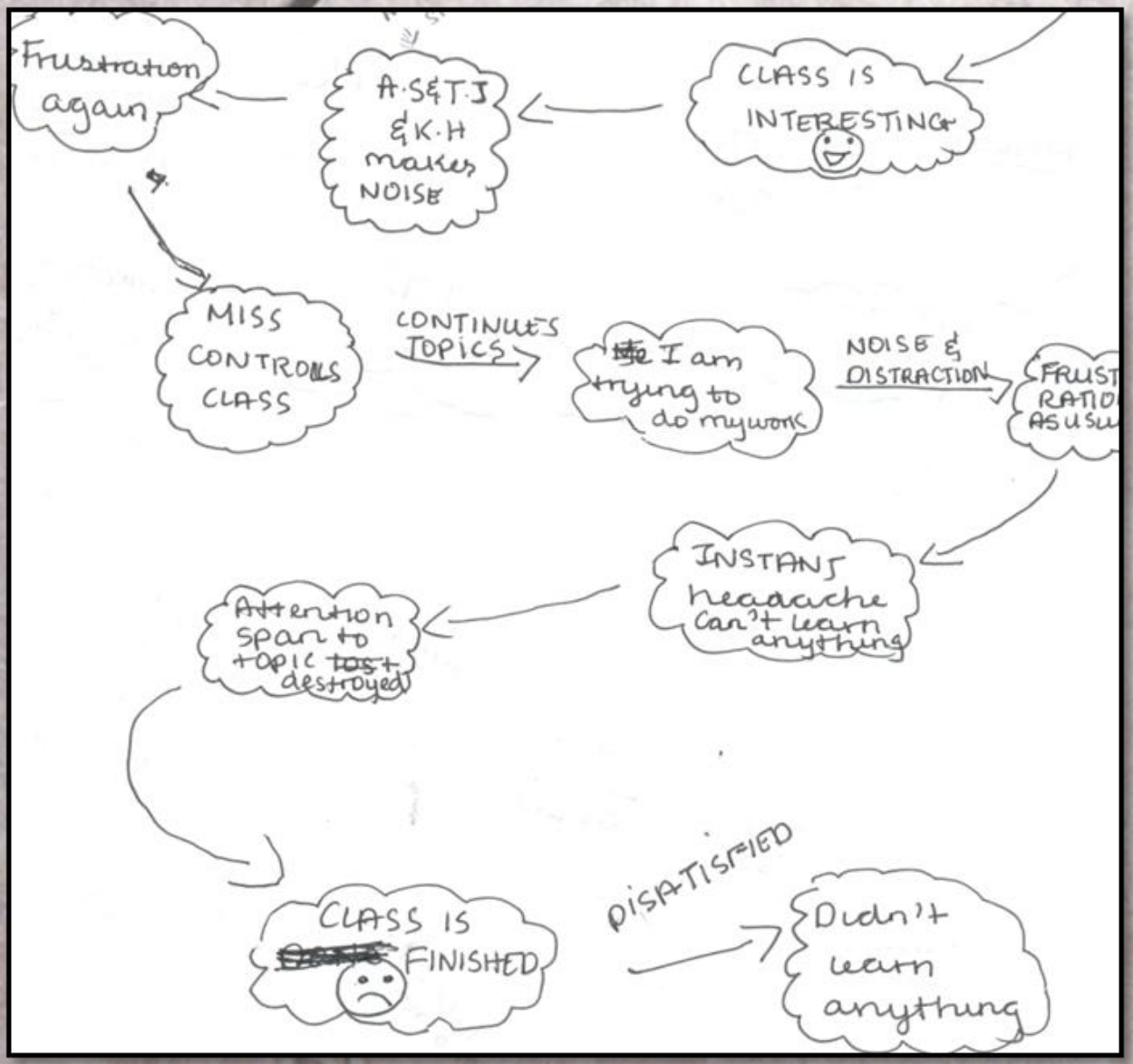
SUCCESSES

FIGURE A

“ The class was exciting! There was a lot more interaction and I think I am learning a little better because last term I used to be like...part of the class I would pay attention and the other part I would just be lost. Now I am a little more focused”

ALICE, 2012

Challenges



Teacher: Alice did you complete the assignment?

Alice: No Miss.

Teacher: Why not?

Alice: Miss....I don't have time. I will do it later...I will think about it

Conflicts

"Grandma says if you wash your hair and you go to sleep you will get sick, or if it doesn't dry properly you will get sick...you see I grow up with these kinda things – you know the bush medicine and stuff. I think you should tell children things that make them ready for the world not things that are not true. Well I not saying the things they say are not true....it just isn't that realistic. Because you telling me you put on wet clothes and you get sick just like that? I mean I don't think it will happen like that. I will tell my children the truth about viruses and bacteria and stuff "

ALICE, 2012

ALICE AND THE WONDERLAND EXPERIENCE: Analysis

- Teacher-constructed bridges may have acted as a form of scaffolding (Vygotsky,1962) that enabled Alice to move to the level where she was able to create her own bridges.
- Self made bridges may hold more meaning and result in deeper understanding. (Herbert, 2008) (George, 1999)
- Some challenges faced may have been avoided if Alice was more open to her own cultural knowledge. (Spindler,1987)
- Students camouflage their cultural knowledge, probably because they feel that it will not stand up to scrutiny in school in the face of conventional science. (Jones,1997)

SUMMARY

- What use did Alice make of teacher constructed bridges?
  - Alice used teacher- constructed bridges to facilitate smooth border crossing as is evidenced by improved performance and increase in interest and motivation
  - Alice used teacher-constructed bridges to scaffold her learning process and eventually construct her own bridges
  - Alice used bridges to engage cultural knowledge which allowed for deep reflection and mapping of cultural knowledge unto teacher indentified conventional science principles

SUMMARY

- What bridges did Alice construct on her own using cultural knowledge?
  - Personal experience Bridges
  - Reflection Bridges
- What is the efficacy of the border crossing process when cultural knowledge is used to build bridges?
  - For Alice, when cultural knowledge was used to build bridges, the border crossing process appeared to be smoother and less hazardous

IMPLICATIONS

- Culturally relevant teaching/learning materials may have a place within science classrooms within Trinidad and Tobago.

- Much research, thought and guidance however must be put into how these teaching/learning materials are developed and utilized in order to make for effective bridge building by students.

Sometimes our light goes out but is blown again into flame by an encounter with another human being. Each of us owes the deepest thanks to those who have rekindled this inner light.“

~Albert Schweitzer

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