IncluSMe
Intercultural learning in Science and Mathematics initial teacher education

Module 12

ASSESSMENT IN MATHEMATICS AND SCIENCE IN MULTICULTURAL CONTEXTS

Worksheets

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IncluSMe
Intercultural learning in Science and Mathematics initial teacher education

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ICSE International Centre for STEM Education

Pädagogische Hochschule Freiburg
Université des Sciences de l'Education · University of Education

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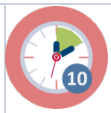
I. Introduction to the topic "Assessment the bridge between teaching and learning"

Activity 1.1: Your personal experience of assessment

Work in groups



10 mins

Think about:

Think of a time when you were assessed and it was a positive experience…	What made it positive?
Think of a time when you were assessed and it was a negative experience…	What made it negative?

In your groups discuss the impact (e.g. on your school achievement, confidence) of each assessment experience mentioned. Note your ideas here.

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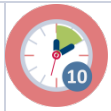
II. Purposes of assessment

Activity 2.1: Case Study

Work in groups



10 mins

Each group is to select a card from the ones available. Each card includes a specific scenario. From each scenario try and discuss what you think is the main purpose of assessment.

Explain each scenario and each purpose of assessment to the whole group. As a whole group make up a list of the purposes of assessment.

List the main purposes of assessment…

Scenario 1:

The students worked on a project and presented their work in class.
Teacher: Jane, you have clearly done a lot of work on this project. Your description was detailed and included all the required information. Next time, I would like you to include some visuals to help the audience follow what you are talking about.
Jane: Thank you.

Scenario 2

The results of an exam are out.
Lina: I did really well and my parents will be pleased.
Thomas: I'm so happy, I scored 90%!
Karen: Well done, you're so bright. I did well too.
Liam: I think we all passed the exam. How much did you score Pierre?
Pierre: … 20%.

Scenario 3

The students are working together on a task in groups. The teacher goes round the groups.
Teacher: You are all taking turns to speak and all members can take part and express their ideas. You are practising good group-work skills.

Scenario 4

A teacher assigns a quiz to test students' prior knowledge before starting a new topic. He was upset by one student's performance as all the answers were incorrect.

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Scenario 5

A teacher observes that a student was working hard and made some improvement in his work.
Teacher: I can see that you are working hard in the progress that you have made.

Scenario 6

The teacher presents a problem to the class. When they finish she asks Matthew to show his working on his mini whiteboard.
Teacher: Thank you Matthew. Your working is correct and so is your final answer. What does your answer 143.50 represent?
Matthew: Oh yes, units – 143.50 Euro.

Scenario 7

A new teacher is talking to other teachers.
Peter: How are you doing James? Are you enjoying teaching?
James: I'm doing fine but some of my students don't seem to be very interested. They just sit there doing nothing.
Peter: Do you they have special learning needs?
Maria: Or perhaps they do not understand the language.
James: I have no idea.

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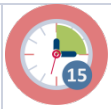
III. Formative and Summative Assessment

Activity 3.2: Case Study

Read and Discuss



15 mins

Read the vignette you have in each of the cards you have been given. Discuss whether you think each scenario depicts formative or summative assessment:

Scenarios	Formative or Summative?
Card 1:	
Card 2:	
Card 3:	
Card 4:	

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Card 1:

A science teacher designs a unit on pulleys. The teacher gives the students a quiz and collects the papers.

Instead of grading the papers, she reads through them carefully, and on the basis of what she discovers about what the class has and has not learned, she plans appropriate remedial activity for the next lessons.

Card 2:

A mathematics teacher finalises the topic on algebra. At the end of the topic, the teacher gives the students a test. The teacher marks the test and the students get a mark for the test.

The teacher also includes comments on each of the tests, telling the students what they had done wrong and what they needed to do to obtain the correct answer.

Card 3:

The students in a secondary school sit for an end-of-school examination in science. The marks obtained by the students are recorded and sent home in a report to the parents.

The marks are also used to classify students so that in the next scholastic year they are placed into a class set with students who have obtained similar marks.

Card 4:

A mathematics teacher is teaching the students about graph sketching. She asks the students to draw a graph of y equal to one over ‚one plus x squared'.

Each student sketches the graph on a mini whiteboard and holds it up for the teacher to see. The teacher sees that the class has understood how to sketch the graph and moves on with the next lesson.

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III. Formative and Summative Assessment

Activity 3.4: Case Study

Read and Discuss	15	15 mins

Read the excerpt below written by Luke.

Luke is an 18 year old student who has just sat for his Advanced Level examinations in Malta.

The examinations are very high stakes for Luke since they will determine whether he can go to University.

Discuss whether you have ever felt like Luke and the impact of high stakes examinations on the lives of students.

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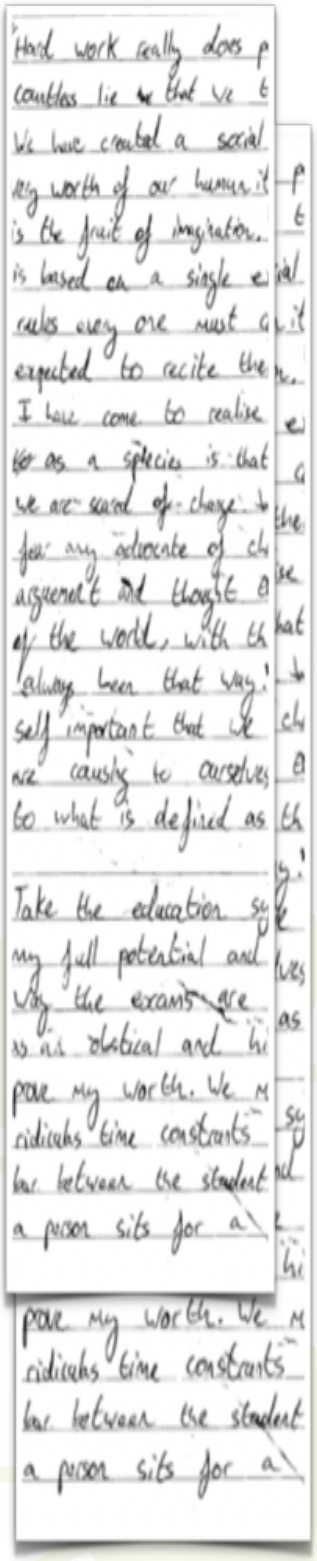
Hard work really does p
countless lie that we t
We have created a social
worth of our humanity it
is the fruit of imagination.
is based on a single e
rules every one must
expected to recite the
I have come to realise
as a species is that
we are scared of change
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"Hard work does pay off" … is one of the countless lies that we tell ourselves throughout our life. We have created a social structure that undermines the very worth of our humanity. It is argued that genius is the fruit of imagination. Yet a person's intellectual capacity is based on a single exam. With a structure set of rules everyone must comply to, where everyone is expected to recite their notes back to an examiner. I have come to realise that while our greatness as a species is that of versatility and adaptation, we are scared of change. We are set in our ways and fear any advocate of change. We shy away from complicated argument and thoughts that challenge our current understanding of the world, with the justification that it has always been that way. Are we truly so ignorant or self important that we cannot see the harm we are causing to ourselves and others by simply conforming to what is defined as the norm.

Take the education system, how can I ever achieve my full potential and mental prowess if the very way the exams are designed and structure act as an obstacle and hindrance rather than a way to prove my worth? Why must we insist on imposing ridiculous time constraints that only serve as a bar between the student and his capabilities? If a person sits for a physics exam isn't his knowledge of physics supposed to be tested, rather than how quickly he works? Must we really value all a student's work, effort and struggle throughout the course on one single day? It is a clear statement of the extent of the failure of the education system when an exam, or rather sitting for one, induces anxiety and triggers nervous breakdowns in students.

But you have to work within the system, I have constantly been told.

The problem most 'examiners' fail to understand is that these negative experiences have repercussions on teens that are far greater than a resit. Self-worth is destroyed, along with self-respect and the notion that in life you get what you deserve. This might lead to alcoholism or drug abuse to cope with the feeling of uselessness that wells up inside us, with students giving up on education altogether.

I wonder how many great minds were lost simply because the type of intelligence and ideas they had were not the ones the examiners wanted.

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IV. Why do Assessment and Educational Achievement Matter?

Activity 4.2: Role Play

Role Play

10 mins

Work out the question on the card as given to you.

Discuss the difficulties that you encountered in trying to answer the question.

Now turn around each card. Can you answer the question now?

Reflect on the difficulties you encountered when you tried to answer the question the first time. How did you feel?

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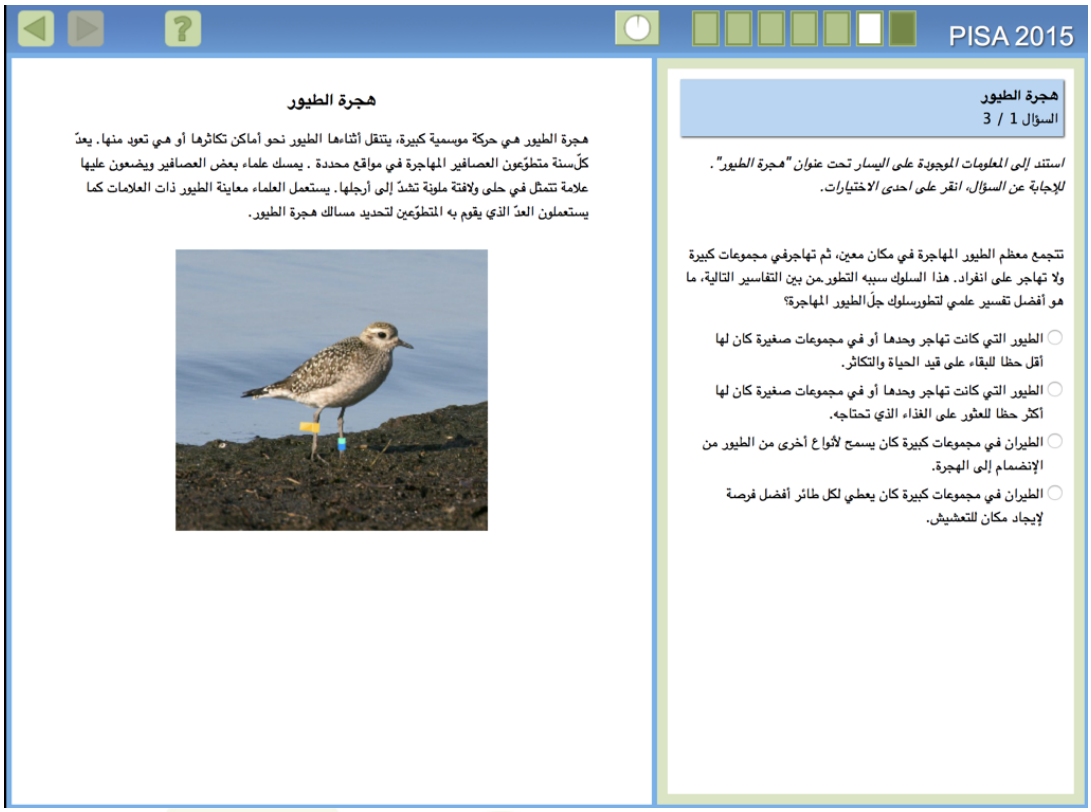
Side 1: Do not turn around until you have attempted to answer the question.



Side 2: Now try to answer the question again.

Bird Migration
Question 1 / 3

Refer to "Bird Migration" on the right. Click on a choice to answer the question.

Most migratory birds gather in one area and then migrate in large groups rather than individually. This behaviour is a result of evolution. Which of the following is the best scientific explanation for the evolution of this behaviour in most migratory birds?

- Birds that migrated individually or in small groups were less likely to survive and have offspring.
- Birds that migrated individually or in small groups were more likely to find adequate food.
- Flying in large groups allowed other bird species to join the migration.
- Flying in large groups allowed each bird to have a better chance of finding a nesting site.

BIRD MIGRATION

Bird migration is a seasonal large-scale movement of birds to and from their breeding grounds. Every year volunteers count migrating birds at specific locations. Scientists capture some of the birds and tag their legs with a combination of coloured rings and flags. The scientists use sightings of tagged birds together with volunteers' counts to determine the migratory routes of birds.

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IV. Assessment Tasks

Activity 4.3: Homework


Homework

Read the paper Wiliam, D. (2006). *Assessment for Learning: Why, what and how.* Institute of Education, University of London.

See the link:
http://www.dylanwiliam.org/Dylan_Wiliams_website/Papers.html
An adapted shorter version of this paper follows.

This text is taken from: Assessment for Learning: why, what and how∗ by Dylan Wiliam, Institute of Education, University of London

Why assessment for learning should be the focus of investment

So, what is assessment for learning? Many people have come up with different kinds of formulations, but I would argue that there are five key strategies that encompass the terrain of assessment for learning or formative assessment. And I would say that if you're not doing one of these five strategies you're not doing assessment for learning, and if you are doing assessment for learning, you're doing one of these five things. The five key strategies are:

- clarifying and understanding learning intentions and criteria for success
- engineering effective classroom discussions, questions and tasks that elicit evidence of learning
- providing feedback that moves learners forward
- activating students as instructional resources for each other, and
- activating students as owners of their own learning

The "big idea" that ties these together is that we use evidence of student learning to adapt teaching and learning, or instruction, to meet student needs.

From this perspective, the whole idea of separating out the quality of teaching from the quality of learning makes very little sense. What are we to make of a lesson where the quality of teaching is good, but the quality of learning is not? It's rather like saying that the operation was a complete success but the patient died. So, when I talk about "activating students as instructional resources for one another", I mean activating students as people involved in helping each other learn.

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Formative assessment, or assessment for learning, is the pedagogy of contingency — the idea that teaching is constantly adaptive. A pilot guides a plane or boat towards its destination by planning a route, taking constant readings, making careful adjustments in response to wind, currents and weather. I flew back from Dubai last week—just imagine what would have happened if the pilot navigated the way that most teachers assess. We'd have set off from Dubai going vaguely northwest, and after six hours the pilot would say "Okay, it's time to land", set down at the nearest airport and ask "Is this Gatwick?". Whether it is or not, they say "I'm sorry, you have to get off now because we're on another flight tomorrow". We teach stuff, and at the end of the teaching we give students a test and that's when we work out whether they've learned something or not, but it's too late to do anything about it because the national strategy says we've got to move on to the next unit tomorrow. So, this notion of keeping learning on track is the idea that the teaching should be constantly responsive to the students, so that if you get to the end of a lesson without having adjusted your teaching to take into account student learning needs you're already behind the game. It's about making your teaching constantly contingent on the students' responses. It's planning a carefully chosen, and possibly differentiated, route ahead of time—in essence, building the track—and taking readings along the way.

There are different timescales for formative assessment. First, there's long cycle formative assessment, across units or terms. For example, you might collect evidence that shows that some students can balance chemical equations and some can't, so before the exam you go over this with the students; you're using evidence about student achievement to adjust your teaching over a long cycle. There's also medium cycle formative assessment within and between teaching units—a cycle length of one to two weeks. For example, you might give students a test before the end of the topic in order to be able to use the information to go over the difficulties before you finish the topic. But the research shows that the kind of formative assessment that has the biggest impact on student learning is short cycle formative assessment. Basically, if you're not using information to make a difference to your teaching within a day or two then it's unlikely to make a difference to student achievement. It's the short cycle formative assessment that really matters, minute by minute, and day by day.

Strategies and techniques for formative assessment

In talking about implementing formative assessment, I want to emphasize the distinction I make between strategies and techniques.

So the five strategies give you a range of things you could work on—you have to choose at least one of those—but then how you work on it is up to you. The strategies define the territory of assessment for learning but teachers are responsible for the choice of techniques for implementing that in practice. The important thing is that teachers need to adapt any technique that anyone else might show them to make it work in their local context.

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Let's look at some of these techniques in a little more detail.

Eliciting evidence of achievement. One of the ideas that we've been developing to help teachers improve the way in which they find out what their students have learnt is the idea of a big question, which teachers work on very carefully in advance. For example, after teaching the students global warming, a teacher might ask, "What can we do to preserve the ozone layer?" and offer the students five alternatives:

A. Reduce the amount of carbon dioxide produced by cars and factories
B. Reduce the greenhouse effect
C. Stop cutting down the rainforests
D. Limit the numbers of cars that can be used when the level of ozone is high
E. Properly dispose of air-conditioners and fridges

The teacher might then ask her students to hold up one, two, three, four or five fingers according to whether they think the answer is A, B, C, D or E. That's a pedagogy of engagement—the teacher is requiring every student to engage in this process, to think about the question and give her some information; after all if a student has not responded, it is very obvious. Then, if every student has responded correctly, she moves on. If no-one gets it right, she might teach it again, preferably in a different way. But if there is a lot of variation in the students' answers, she can direct the students to talk about their answers with their neighbours. This is a pedagogy of contingency. Her actions depend on the learning that is evidenced by her questioning. One teacher I have worked with tends to use four different alternatives, and has labelled each corner of her classroom A, B, C and D. Where the answers are distributed across all the possible responses, she asks the students to collect together with the other students who chose the same answer in the appropriate corner, and the students plan together how they are going to persuade the students in the other corners that they are wrong. This is a pedagogy of engagement because the students have to get involved, and it's a pedagogy of contingency because the teacher is doing something that she couldn't have done until she knew what it was that each student thought was the correct answer. This question, incidentally, also illustrates another important point, which is that the rules for this kind of activity are very different from other testing contexts. For example, it is entirely appropriate, in a low-stakes classroom context, to include "trick questions" as above. The only correct response to this question is E, because it is a question about the ozone layer, not global warming. And yet, the correct response looks like a "makeweight" that has been inserted because the question setter couldn't be bothered to think of a proper fifth alternative.

Providing feedback that moves learners forward. A further practical technique—comment-only marking—elicited confusion from a maths teacher who asked us how he could do that in maths. We suggested that instead of telling students that they got 15 out of 20, the teacher could, instead, tell them that five of their answers were wrong, and that they should find them and fix them. The important feature of this feedback, like comment-only marking, is that it engages students, leaving them with something to do. This technique was subsequently adopted by English teachers when they provided feedback on students' final drafts of writing assignments. Rather than

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correcting spelling, punctuation and grammar, the teachers put a letter in the margin for each error in that line using a G if for an error in grammar, an S for a spelling mistake, a P for a punctuation, and so on. For the stronger students, the teacher would simply put a dot in the margin for each error, and for the weaker student, the teacher might indicate where in the line the error was. The idea is that the feedback gives something to the learner to do so that the immediate reaction of the learner is that they have to think.

Another way of providing feedback that moves learners forward is the idea of a 'three-quarters of the way through a unit' test instead of an 'end of unit' test. There's a problem with that because if, as a student, you get 95% on your test and your neighbour gets 45%, and then someone tells her what to do and she gets the same score as you, it's considered unfair. You should get a higher mark because you got it right first time. But think about that in the context of an MOT test for your car. My car passes first time, while yours fails on its catalytic converter. The garage tells you what's wrong with your car—they don't just say bring it back when it's better—and when you get the problem fixed you get the same certificate as me. Is that unfair too? It's an absurd example but it shows that we're too locked into thinking about the purpose of assessment, the sorting and ranking and grading of students, than actually giving the teacher information about whether the class is ready to move on. It doesn't mean you wait for everybody because otherwise you will still be at unit one at Christmas but it does give you the information about whether the class is ready to move on, and you make that decision.

Sharing learning intentions. Many teachers provide students with lists of "success criteria" but these are often opaque to students. That's why it is particularly helpful to give students examples of annotated student work to "flesh out" learning intentions and success criteria (suitably anonymized of course). It is also very valuable to provide students with opportunities to design their own tests. There was a very interesting study done in 1994 where different groups of students were preparing for exams in different ways. Some students revised the materials they'd been studying, some students practised on "mock" tests and one group of students was asked to make up test questions (with answers!) on what they'd been learning. This last group got the highest score on the test. So if all you care about is cramming students for tests then the best way to do that is get them to create their own test questions.

Students as owners of their own learning. In one classroom where I've been doing some observation, every student has a disc which is red on one side and green on the other. When the lesson starts the green face is showing. The teacher goes through an explanation of the topic and if a student doesn't understand what's going on, they just flip the disc over to red. As soon as one student flips the disc over to red the teacher picks on a student who's showing green and that student has to come out to the front of the classroom and answer the question that the student who's showing red wants to ask. This technique is interesting because it embodies both pedagogies of engagement and pedagogies of contingency. In that classroom there is nowhere to hide because you're either saying you understand or you're saying that you want some help so that students are required to think about whether they understand or not (what psychologists call metacognition). The strategy is activating students as owners

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of their own learning, but it's also allowing the teacher to be responsive to the students' needs.

Activating students as instructional resources for one another. One technique that facilitates students helping each other in their learning is the "pre-flight checklist". Before a student can submit, say, a lab report in science, the teacher requires the student to get a peer to complete a pre-flight checklist, which includes items such as whether the diagram is in pencil and labelled, whether it includes a title, a margin etc. The student can't hand in the report for marking until he or she has had this pre-flight checklist completed by a peer, and the peer has to sign that the check is complete. Then, if there's anything that's been missed on the pre-flight checklist that should have been there, it's the student who did the pre-flight checklist that's in trouble, not the person who submitted it. In this way one can force students to take seriously providing support for each other. The interesting thing about this technique is that it involves at least two strategies. It involves activating students as instructional resources for one another, but the person who completes the pre-flight check also has to understand the success criteria, in order to complete the pre-flight check. Furthermore, once students internalize the success criteria when assessing another student's work, it also enables them to use the insights gained in their own work.

The reason for distinguishing between strategies and techniques is that the strategies are always a good idea, but the particular techniques used to embody these strategies need to be chosen carefully, taking into account the subject matter, the students, and the context. For example, one technique for increasing student engagement during classroom questioning is to have the students' names on lollipop sticks, so that after you have asked a question, you can pick a name at random. This works well with younger children, but may not work so well for older students. Having said that, I have seen it used very effectively with A-level maths students. After all, when you ask an 18 year old a question in front of their peers, the first thing that goes through their mind is "why are you picking on me?" With the lollipop sticks, the answer is that it is random. It's just their unlucky day. They have to deal with it and answer the question.

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V. Fairness in Assessment: Equality or Equity?

Activity 5.1: Game

Game	15 mins

Game:

1. You have been given a plastic cup.
2. You have a bucket full of water behind you and an empty bucket some distance in front of you.
3. On the signal fill your cup with water and run to the other end.
4. Your job is to try and fill up the empty bucket with as much water as you can in 4 minutes.
5. The person with the fullest bucket will be the winner.

Reflect:

Who managed to win the game? How can you relate this to fair assessment?

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V. Fairness in Assessment: Equality or Equity?

Activity 5.2: Reflecting about equality and equity

Work in groups | **15 mins**

Look at the picture below:

(with permission from Moira Tabone Farrugia)

In your groups discuss:

When you see the picture what do you see?

All children are given the same support – equality…

Do you think this is fair?

What is unjust about it?

How could you fix it to make it fairer?

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V. Fairness in Assessment: Equality or Equity?

Activity 5.3: Equality vs equity in an assessment situation

Work in groups

30 mins

Look at the picture below:

(with permission from Moira Tabone Farrugia)

In your groups discuss:

How is this related to classroom assessment?

In each group make up an assessment situation that you think is unfair. Think about how you could make the assessment fairer.

Share the situation with the whole group.

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V. Fairness in Assessment: Equality or Equity?

Activity 5.4: Discussion – fairness in assessment

Work in groups

10 mins

"Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid."
Albert Einstein

Discuss:

Who decides when, how and what should be assessed?

What about the skills that we cannot assess (for example empathy)?

Should these skills be taught at school?

It is common that due to time constraints teachers
put aside knowledge that is not assessed in high stakes examinations.

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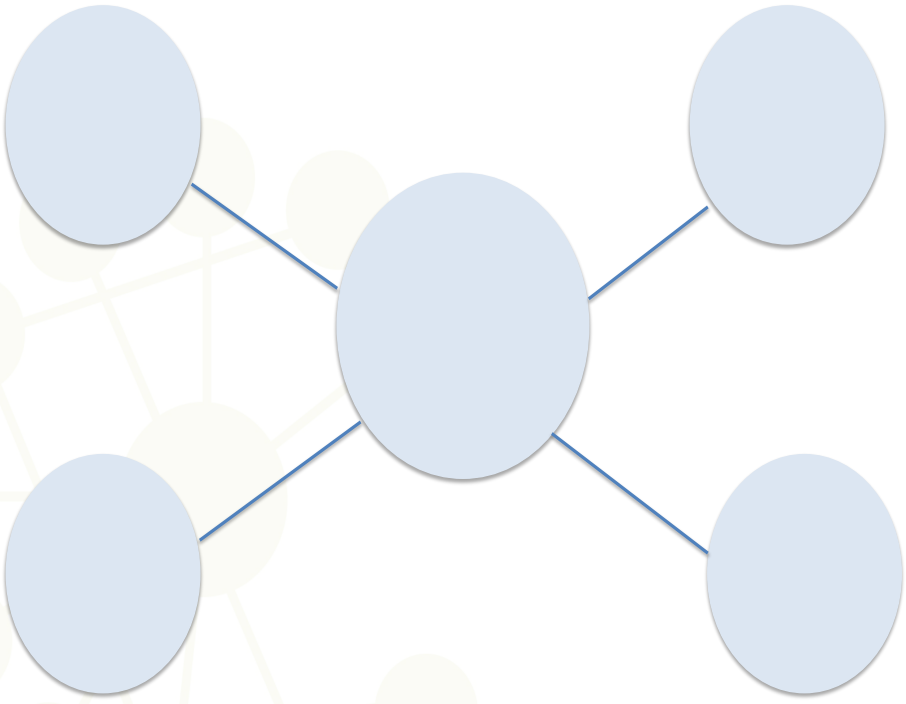
VI. Assessment strategies

Activity 6.2: Groups I identify with

Work in groups	30 mins		

- **Can we define culture? Let's work on this short activity.**

- Use the circle handout.
- Place your name at the center circle.
- Write other important aspects of who you are in each of the satellite circles (something that identifies you such as British, German, Maltese, athlete) or any other descriptor with which you identify. You may add other circles.



- Based on what you have written would you identify yourself with one or more specific groups?

- How may this help us focus on similarities rather than differences between our students?

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VI. Assessment strategies

Activity 6.3: Case Study

10 min

Read an excerpt from the diary of the teacher (Ms. Maria) and discuss how she looks at diversity in her classroom…

In your groups discuss how the teacher can take this difference into account when assessing the students.

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My School Journal

First Day of School

My name is Maria Cassar and I am a first year science teacher in a Maltese secondary school.

I was very excited on my first day of school. I was going to teach science to a group of 12 year old students. It was my very first experience and I did not know what to expect. I was nervous and anxious as I walked into the classroom not knowing who my students were and how they would react to me as their teacher. I went in and introduced myself and then slowly I looked around to see who my students were and I was met with a number of things

Dealing with Diversity

The first thing that hit me was the culture shock and how little I knew about my students … but I wanted to find ways in which to deal with the diversity …

My first reaction was to panic. How was I going to teach such a diverse class? How was I going to communicate with foreign students who could speak neither Maltese nor English and how was I going to communicate with Maltese students who would not speak English? In the Maltese context

1
BOYS & GIRLS
This was a new thing for Maltese classes and I myself had attended a single-sex school.

2
MULTICULTURAL
The students came from a variety of different countries and cultures.

3
DIVERSE
The students were all very different and seemed to have different expectations.

Sarah

S

A brilliant mathematics student, always teased by her peers.

L

Louis
An immigrant boy who could speak neither Maltese nor English.

C

Carmen
Maltese nationality but could not speak English and communicated only in Maltese.

1

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usually teachers are told to teach using both languages or code-switching but would I be able to do that? Would I be able to reach all of my students. I also had the added problem that students came from different cultures. Some thrived when working in groups. Some were clearly more comfortable working on their own and some were highly competitive due to their cultural upbringing. They believed that doing well at school would be the solution to all their problems and enable to move out of their situation.

"We need to acknowledge that learning and assessment are not neutral".

Following Elwood and Murphy (2015), I tried to find out ways in which to embed the learning experiences and assessments I was preparing in the social and cultural experiences of my students, their interests, their culture and what made them interested in science.

GETTING TO KNOW STUDENTS

Before starting to teach them science, I tried to get to know my students. I told each of the students to bring something from their own home and cultural background and which was important to them. I told the students that they would need to explain why it was important to their culture and whether it had any association with science.

I asked them to bring photographs, objects, and talk about them to their schoolmates. As they talked I took notes which I later used to prepare my science lessons. It was an eye-opening experience for both myself as my students.

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VI. Cultural responsive assessment strategies

Activity 6.4: Models of responding to diversity

Work individually

10 mins

Answer the questionnaire.

Choose a, b or c…based on your experience of teaching or on what you think you might do when teaching…

(a) I never ask my students about their cultural background.
(b) I sometimes ask my students about their cultural background.
(c) I try and get to know as much as I can about the cultural background of my students.

(a) I never ask students questions about their families.
(b) I talk to students about their families but never use students' background in my lessons.
(c) I get to know my students and their families and try to use any information to create a context for my science lessons.

(a) I get irritated when students do not answer my questions and appear shy and introverted.
(b) I try and talk to students to find out why they are behaving in particular ways but do nothing about it.
(c) I try to understand where students are coming from and am accepting of different ways of behaving in the science classroom.

(a) I have never met the parents or siblings of my students.
(b) I ask students about their parents and siblings but never try to meet them.
(c) I invite parents to come to visit the science class so that I can get to know them better.

(a) I always assess my students using a written test or examination.
(b) I try to use different forms of assessment but due to time constraints I end up using tests anyway.
(c) I try and use different assessment tasks so that I can cater for the different needs of my students.

(a) I always use my native language and do not go out of my way to see whether my students are understanding me.
(b) I ask my students whether they can understand the language I use to teach science but since I do not speak different languages I end up using my native language anyway.
(c) I find out which languages my students can speak and understand and try to find ways in which to communicate with my students.

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Reflection on Results:

If you have answered mostly (a) please move to the front of the class.

If you have answered mostly (b) please move to the back of the class.

If you have answered mostly (c) please stay where you are.

Your answers indicate how you view students:

Mostly (a): You have limited awareness of students' cultural background. (The Assimilative Model)

Mostly (b): You recognise and appreciate the experiences students bring with them into the science/mathematics classroom. (The Recognition Model)

Mostly (c): You accept that students bring with them different cultural knowledge and use this to enrich your science/mathematics lessons. (The Interactive Model)

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VI. Culturally responsive assessment strategies

Activity 6.5: Homework


Read the paper:

Stobart, G. (2005). Fairness in multicultural assessment systems. *Assessment in Education,* 12(3), 275-287.

See the link here:
https://cmap.helsinki.fi/rid=1G5ND3134-GLXTVW-1WM/fairness_multicultural_assessmentsystems.pdf

A summary of the paper can be found below.

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Discussion Paper

This is adapted from the paper by Stobart, G. (2005). Fairness in multicultural assessment systems. Assessment in Education, 12(3), 275-287.

Fair Assessment

What does 'fair assessment' mean in a multicultural society? The key assumption made in the paper is that fairness is fundamentally a sociocultural, rather than a technical issue. Assessment is linked to curriculum and learning and as Gee (2003) puts it 'if two children are being assessed on something they have not had equivalent opportunities to learn, the assessment is unjust.'

Fairness and Equity

Equity in this paper is defined as 'a qualitative concern for what is just. The paper also makes a distinction between 'equity' and 'equality'. They are not the same. Equity represents the judgement about whether equality, be it in the form of opportunity and/or of outcomes, achieves just (fair) results. Equality is essentially a quantitative approach to differences between groups. If fairness is being considered then the issue of one group performing differently from another cannot be resolved simply at a quantitative level.

Whose fairness is it?

Assessment is a socially embedded activity that can only be understood in the cultural, economic and political context in which it takes place. Researchers have claimed that it can be used as a form of social control. For example, examinations, while considered to be a fair and equitable form of selection, can be considered to be biased towards those with social capital (typically the middle class) and show little regard for certain groups such as females and groups from different social class.

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Stobart argues that examinations were first introduced in England in the nineteenth century in order to promote 'fair' selection. This view has been challenged although examinations are still seen as the best way to assess basic abilities. For Stobart both points of view can hold water in that one can argue that exams are important as a means of equalizing opportunity and as a necessary corrective to patronage, while at the same time understanding that tests may be biased in favour of one particular gender, social or ethnic group.

Fair assessment, access and curriculum

Stobart suggests that fair assessment is inseparable from questions related to access, curriculum and assessment. It is important to question with regards to access whether there are differences in resources available to different groups and whether different cultures are incorporated in the assessment.

In relation to curriculum one should question the knowledge being taught, and whether the histories of different cultures are incorporated into this knowledge. In relation to assessment, we need to question what knowledge is equated with achievement and whether the modes of assessment are appropriate for individuals from different groups and finally whether the cultural knowledge of different groups is reflected in our definitions of achievement.

The main question is, whose knowledge is being valued and equated with achievement. This is an issue that revolves around cultural capital.

Fair assessment in large-scale testing systems

Stobart discussed four key areas within large-scale testing/examinations systems in which to raise issues of fairness:

- The nature of the assessment system itself (how are cultural and linguistic diversity approached)?
- How does the content of the assessment reflect the experiences of different groups?

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- How do assessment methods meet the cultural diversity of the candidates?
- How effectively is the performance of different groups monitored?

In different countries the way in which assessment is carried out varies differently. In some countries assessment is the responsibility of the school while in others the assessment is strongly regulated by the government or government agencies. Examination boards also play an important role.

Shohamy (2000) has proposed three models of how the contributions of different groups are treated:

1. The assimilative model: In this model there is no appreciation of an immigrant's previous knowledge; the task is to master the new knowledge associated with the dominant group.

2. The recognition model: In this model there is recognition and appreciation of the different knowledge and viewing it as valuable – a situation in which groups are credited of this knowledge and encouraged to maintain it.

3. The interactive model: In this model the knowledge of the 'different' groups affects and influences the dominant group and thus enriches existing knowledge.

Examination centers also need to ensure that there is fairness of access to resources and in curriculum. They try to ensure a 'level-playing field'.

The content of assessment

There is no cultural neutrality in assessment or in the selection of what is to be assessment. We need to question:

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- When setting test content are we sure it is the knowledge that we need?
- Are we really privileging certain knowledge to maintain a dominant culture?

The issue for test developers is how they ensure that their sampling of the subject offers opportunities for the different groups who will be taking the test.

Assessment methods

Different forms of assessment can affect the results of different groups. For example we need to learn more about whether the emphasis on written response disadvantages groups who place more emphasis on oral communication in their culture.

We could aim to encourage the use of a range of assessment modes and tasks so that those who are disadvantaged on one assessment have an opportunity to offer alternative evidence of expertise.

Monitoring Assessment

Stobart argues that we need to make use of data about the performance on tests of different groups of students. We can use the data to find out how our assessments impact the progress of students from different groups.

Conclusion

The argument is that fairness is essentially a social process and judgement, 'a qualitative concern for what is just,' which is informed by, but not the same as equality.

We will never achieve fair assessment, but we can make it 'fairer'

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VI. Culturally responsive assessment strategies

Activity 6.6: Discussion

15 mins.

After reading the paper by Gordon Stobart (2005) and after having discussed as a whole group some of the characteristics of culturally responsive assessment...

…Read the excerpt from the journal written by Ms. Maria, a Maltese science teacher…

…What practical suggestions is Ms. Maria offering?

…Do you agree with these suggestions?

…Do you think it would be feasible to implement them in your own science/mathematics classes?

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My School Journal

Some examples from practice

Being aware of cultural differences

As I continued my journey as a first year science teacher I talked to a number of colleagues who gave me many examples from their practice.

First I learned a bit more about the background of my students. I then needed to find ways of incorporating what I had learned about my students in my lessons. I also used a number of books to help me out. But these are the main things that I tried to do …

Language
I needed to take into consideration the fact that the specialised language of science might be difficult for some students who could not communicate in English including some of the Maltese students.

Word bank
I asked students to develop a word bank or a dictionary of the words they found difficult and to draw a picture of what they thought the word meant or translate it into their own language.

Think-Pair-Share
Students were asked to work in pairs and to discuss the work being done in class. Students could explain to each other what they were finding difficult, drawing on their own personal language skills.

1

NOTHING FOR GRANTED

Some students may not be familiar with what seems to be common place.

2

USE DISCUSSION

Use discussion to ensure that all students understand the examples used.

3

VARIOUS ASSESSMENT MODES

Multiple modes of assessment are used to allow students to show what they learned.

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Assessing students formatively

I wanted to ensure that my students were learning and that I was getting feedback about their progress.

Assessment in my science classes is based on the principles of formative assessment. The protocol which I follow is:

1. Work with the students to set targets for the lesson. Together we write "I can" statements.

2. I design lessons that include a variety of activities that allow students to work on tasks that are practical and hands-on, written, oral. They work on posters, presentations and experiments.

3. I give students assessment tasks that allow them to show me what they know and can do in different ways, such as by drawing, writing, actually doing something or even by explaining things to me. Students can choose the way in which they wish to show me what they have learned.

"Feedback is the step that has a positive impact on what students learn".

Following Black and Wiliam (1998), I:

4. Give students feedback on their work. I try to use rubrics so that students understand what they need to do.

5. I allow students to work on their own and with their peers to learn how to evaluate their work and what is expected of them. Students enjoy this very much.

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An Assessment Task

The Task

Choose one of the individuals below and develop a diet plan for them:
An international football player.
A four year old child.
An old person suffering from diabetes and high blood pressure.
An eleven year old school girl.

Design a daily menu plan for the individual of your choice.
Write a letter to the individual explaining your food choices.

The menu should be handed in on the 25th February 2019.
You will be marked according to the attached feedback sheet.

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Assessment Criteria: Balanced Diet Menu

Student Name:

Criterion	Exemplary 3 marks	Good 2 marks	Needs Improvement 1 mark	Mark out of 20
1. The menu includes a variety of different food groups.	Foods from all the major nutritional food groups are included.	A variety of foods are included but not all food groups are included.	Limited variety of foods are included.	
2. The diet presented is balanced.	A balanced healthy diet is recommended.	The diet is healthy but not balanced.	The diet includes food not good for the individual identified.	
3. The letter gives reasons for choice of foods.	The correct reasons for the choice of foods is given.	A number of reasons are given but not all are the adequate reason.	The reasons for choice of food are very limited and at times incorrect.	
4. Presentation.	Excellent presentation.	Good presentation.	Presentation could be improved.	
			Total Mark:	

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VII. Designing 'Fairer' Assessment Tasks

Activity 7.2: Get to know someone

Work in groups

10 mins

Sit next to someone you don't know.

Get to know three things about him/her.
Two of them are true and one should be untrue.

Then each student in a pair introduces the other to the whole group. As a group, try to find out which are the true statements in order to find the true identity of each individual. How did you conclude that a particular statement is untrue? Is it due to stereotypes?

As a whole group discuss:

The importance of getting to know someone.
How easy is it to get to know your students?
What can you do to get to know your students better?

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VII. Designing 'Fairer' Assessment Tasks

Activity 7.3: Dealing with diversity

Work in groups

10 mins

Think about:

Assessing diverse students fairly and equitably…

In your groups discuss:

What types of assessments should I use to support diverse students?

Should I assess some students using different assessments?

Do my assessment tasks capture knowledge some students might know but others do not?

Should I allow students to show what they know and can do in ways that they find easier?

Discuss. Share one of your answers.

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VII. Designing 'fairer' assessment tasks

Activity 7.4: Designing a Lesson Plan including assessment tasks

Work individually

Your final task will include an assignment.

This assignment includes designing a lesson plan taking into consideration the diversity of the students in your science or mathematics classroom.

You will also be asked to present your lesson plan to your peers so that you can obtain formative feedback on your work.

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ASSIGNMENT

Student Name:

Consider the following scenario:

Imagine that you are a first year science/mathematics teacher in a multicultural school. You have three students who do not speak the local language and two students who can communicate orally but cannot read and write. You need to plan a lesson on a topic of your choice (e.g. density or area) and design an assessment task that will take into consideration the diversity of the students in your class.

The **assignment** will be assessed in two parts:

A. A **write up** of your lesson plan and assessment task including a short reflection (see below). This should Include:

1. A lesson plan on a topic of your choice (A single lesson is enough).
2. The learning outcomes and success criteria for the lesson.
3. The assessment task that you will use to assess student learning (this should take the diversity of the students in your class into consideration).
4. The strategies you used to try and be 'fairer' with all the students.
5. A short reflection (between 200 and 250 words) on how science and mathematics teachers can make assessment 'fairer' and 'equitable' for all students.

B. A short **presentation** of your work:

The **presentation** should include a short description of the context of the lesson, the learning outcomes for the lesson, the assessment task and a short discussion of how you tried to be 'fairer' with all the students in your class.

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Assessment Criteria:

Criteria	Exemplary 20 - 16 marks	Good 15 - 11 marks	Needs Improvement 10 - 6 marks	Unsatisfactory 5 - 0 marks
The Lesson Plan				
Learning Outcomes				
The Assessment Task				
Diversity Strategies				
Reflection				
Presentation				
Comments				

Mark: _____ **Grade:** _____

Lecturer: _____ **Date:** _____

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