



CURIOUS ABOUT CLASSROOM MAKERSPACES?

by Lawrence Manyesa & Wilhemina Motileng, LEAP Science & Maths Schools



Classroom Makerspace

The following resource is derived from a workshop presented by Lawrence Manyesa and Wilhemina Motileng from LEAP Science and Maths Schools at the GTI Axis Summit 2019. We also acknowledge the support of organized by Sarah-Lee Frewen from the Get Ahead Project in organizing the Makerspace Zone at the Summit. This resource contains tools and tips for creating a trans-disciplinary learning place that provides creative time and space for learners to build prototypes, explore questions, bounce ideas off one another and build something together.

Makerspace is a project-based space geared towards developing learners' 21st century skills. Makerspace provides hands-on creative ways to encourage learners to design, experiment, build and invent as they deeply engage in science, engineering and tinkering. Makerspace accommodates a wide range of activities, tools and materials from science, to wood-making to art. Each Makerspace is unique. Some comprise environments with high tech equipment such as 3D printers, laser cutters and soldering irons and others have no technology and rely instead on simpler materials like cardboard, basic art supplies and recyclable materials. Diversity and cross-pollination of activities and making and exploration processes are critical to its design. Crucially, Makerspaces are communal. The goal is to work together to learn, collaborate, and share.

Learners gain several important skills through Makerspaces; these include [*the 4 Cs*](#):

Collaboration –brainstorming ideas and working together in order to create a project.

Creativity - thinking outside the box and developing ideas, learners get to fire up their imagination and discover new ways of problem solving and designing.

Critical Thinking - learners strengthen their decision-making abilities as they rely on one another and not the teacher's instructions.

Communication – communication is used throughout this process, during the brainstorming and the creation of a project.

1. What's in a Makerspace

A Makerspace is a collaborative workspace and creative process curated in learning centers such as schools, libraries, and or other private and public facilities to facilitate learning and exploration through educational tools, resources and equipment that range from high technology to no technology. The Makerspace is open to adults and children alike and takes on a multidisciplinary approach to teaching, exploration and learning.

Although Makerspaces have traditionally looked towards centering the development of 21st century skills in the science, technology, engineering and math (STEM) disciplines, through electronics, 3D printing, 3D modelling, coding, robotics and even woodworking, the concept of a

Makerspace has been applied and adapted in different ways in different contexts. Whereas some have used Makerspaces to cultivate and hone entrepreneurial skills through incubators and business acceleration labs, others have used the Makerspace concepts to create TechLabs and TechShops. At the heart of all these varying initiatives is the common thread of collaboration and creativity and a flexible space for sharing and learning.

The Makerspace, therefore, is an adaptable concept and workspace which can be designed according to the needs and specifics of each learning center and the people it services.

2. Educational Makerspaces

Educational Makerspaces were developed to equip schools and libraries to create their own Makerspaces which can adequately prepare learners to embody 21st century skills. While the adaptation of educational Makerspaces varies from one social context to another, they are all devoted to affirming the use of curiosity, creativity and imagination such that the process of learning and making things is prioritized over the outcome of that process. This encourages self-directed learning and orientates learners towards a trans disciplinary mode of learning.



3. How to create a Makerspace

Step 1: Surf the web

Make use of the web. The internet is full of brilliant suggestions for Makerspace supply lists, project ideas, and tools for managing STEAM-based maker programs in schools. Follow STEAM teachers on social media, search YouTube for relevant videos, visit a Makerspace if you can and test some projects out on your own.

Step 2: Bring the outside world in

Makerspaces use everything from cardboard boxes to office supplies to ice-cream sticks. Parents are a resource too. What do parents throw away that you could use? Glass baby food jars can be used as paint holders. Empty tissue boxes can be used as supply containers.

There are a number of places from which you can source materials for your Makerspace. Some of these are captured below.

Get Started - These are the items needed that are most likely already in the classroom such as balloons, paint, markers etc.

Dig Deeper - Items you may need to purchase which will take STEAM lessons to the next level such as Lego, a microphone, scissors, etc.

Web Resources - Websites which learners can access to help them find ideas, e.g. graphic design sites such as Canva and Piktochart.

Apps for STEAM - Free and paid apps such as iMovie

For Your Consideration - Think about how to store, charge and provide room for learners to explore, create and share their work. Items such as labels and shelving will be needed.

STEAM Units of Study - Sample ideas for STEAM-driven units of study to use, such as animating a story and designing a musical instrument.

Step 3: Turn any space into a Makerspace and give time to explore

Local and school-based libraries around the country are swiftly becoming Makerspaces – a natural extension as libraries have always been a central location for community learning. Take a walk around your own school, noting where you could easily manipulate the space to offer the chance for low-stakes creative STEAM-based learning and for bigger group projects too.

Step 4: Start a design challenge practice

Once you've got a Makerspace assembled, commit to making creativity and innovation routine in your school by hosting regular design challenges (whether weekly, monthly, or once a semester). The goal is to get students engaged in design thinking, collaboration, and problem-solving.

Step 5: Get creative with the curriculum

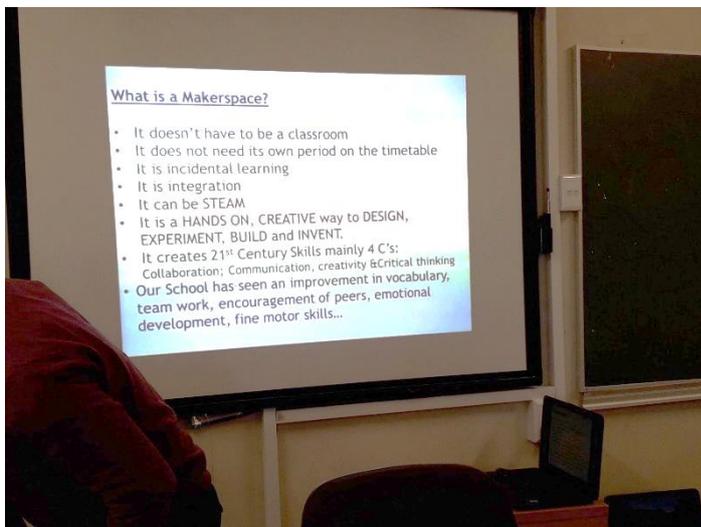
While Makerspace learning time need not always live within the high-stakes curriculum, maker education should connect to classroom learning. Consider ways to incorporate maker projects into your everyday unit and lesson plans, as well as long-term projects. Doing so cements the association between real-world curiosity and experimentation to more structured and measured classroom instruction.

4. GTI takes Makerspaces

In a Community of Practice session held at the 2019 Global Teachers Institute Summit, the Makerspace was introduced as an exciting pedagogical alternative and mindset which stimulates and encourages different kinds of learning. The Makerspace zone was curated by Sarah Lee Frewen and Lawrence Manyesa and was facilitated in a fun, open and creative way that prefigured some of the Makerspace principles in an introductory paper-plane flying contest.

This exercise reminded participants that the process of making things stimulates dormant skills which have been learnt over the span of one's life, thus suggesting that teachers and learners alike are likely to draw on existing knowledge to grasp new concepts. Educational Makerspace zones make this possible. While there are many alternatives to traditional high-technology Makerspace zones, it is critical to note that the same learning outcomes can be achieved without the same spatial and infrastructural resources that are commonly associated with traditional Makerspace zones.

Using recycled goods in a designated corner of a classroom, or simply curating imaginative collaborative spaces for learners to create, share and learn has proven to be an invaluable experience in the South African primary schools where Makerspaces have been piloted. This is particularly the case in Queenstown, Eastern Cape. Makerspaces are not limited to classrooms and may actually pertain more to a mindset than they do physical space.



Whereas Makerspaces have previously focused on STEM, they are also adaptable to STEAM: Science Technology Engineering Arts and Math's. The importance of including the Arts in the Makerspace thematic focus areas was exemplified by the diversity of lesson plans that were shared and discussed during the Makerspace community of practice at the GTI Summit.

These lesson plans were from a range of academic disciplines, with one example which stands out: using a weather report dramatic re-enactment in order to introduce complex geography concepts.

5. More on Makerspaces

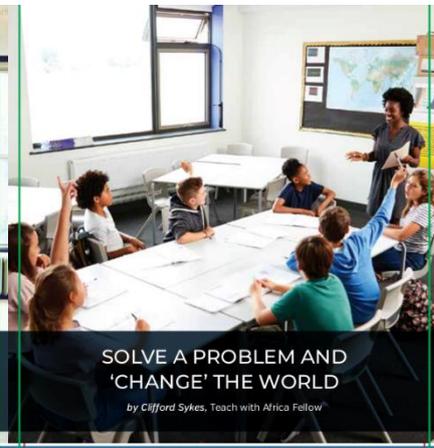
Makerspace possibilities are endless: for more information on Makerspaces visit:

www.makerspaces.com



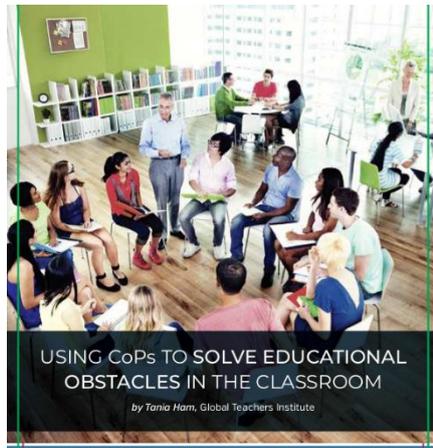
EXPERIENCE THIS!

by Kurt Mirnaar, Dreamer Education



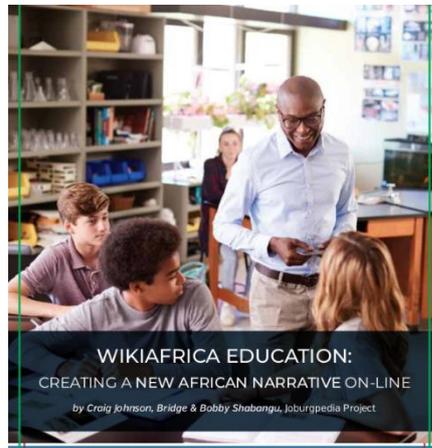
**SOLVE A PROBLEM AND
'CHANGE' THE WORLD**

by Clifford Sykes, Teach with Africa Fellow



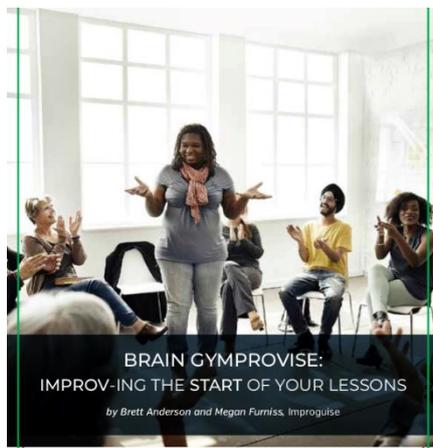
**USING CoPs TO SOLVE EDUCATIONAL
OBSTACLES IN THE CLASSROOM**

by Tania Ham, Global Teachers Institute



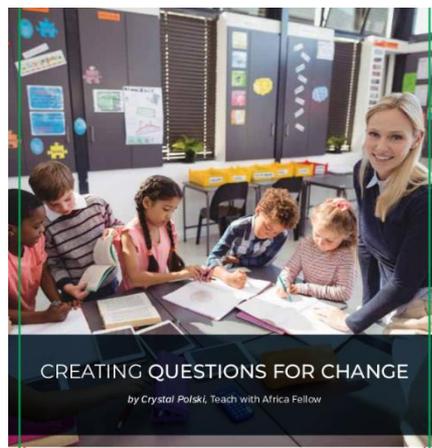
**WIKIAFRICA EDUCATION:
CREATING A NEW AFRICAN NARRATIVE ON-LINE**

by Craig Johnson, Bridge & Bobby Shabangu, Jaburpédia Project



**BRAIN GYMPROVISE:
IMPROVING THE START OF YOUR LESSONS**

by Brett Anderson and Megan Furniss, Improvise



CREATING QUESTIONS FOR CHANGE

by Crystal Polski, Teach with Africa Fellow



**CURIOS ABOUT
CLASSROOM MAKERSPACES?**

by Lawrence Manyasa & Wilhemina Motleng, LEAP Science & Maths Schools



MAKING MAGIC HAPPEN EVERY DAY

by John McBride, Teachink

Download the full series at: <http://knowledge.globalteachers.org>

ABOUT GTI

The Global Teachers Institute (GTI) is a teacher development network of educators, schools and organisations committed to developing high quality teachers through school based initial teacher education programmes, international exchanges and collaborative platforms.

Our mission is to develop reflective, empathetic, socially responsible master teachers for high-need African schools through projects and interventions for replication and scale.

THANK YOU

With your contributions in the 2019 GTI Axis Summit, you've demonstrated your commitment to our work of teacher development. Your support has repeatedly played a key role in getting us a step closer to our vision of training quality teachers facilitating learning that creates a just, equitable and inclusive world.

PRESENTERS



Lawrence Manyesa

Lawrence Manyesa holds a B.Ed. in English and Communication Studies and a PGCE (FET). He is currently studying for Master of Education in Educational Management.

Having taught in Zimbabwe and South Africa, he has 15 years of teaching experience, 8 of which he has held positions of school leadership. Lawrence is currently the School Network Leader at LEAP Science and Maths schools.



Wilhemina Motileng

Wilhemina Motileng grew up in Hammanskraal. Wilhemina joined LEAP in 2012 after graduating from university with a BSc Degree and PGCE.

She is a Teach South Africa ambassador. She was an Instructional Leader and is currently the School Leader at LEAP 6.

PRODUCER



Virginia Mashiane

'I hold a BA in Political Studies and International Relations, as well as a BA Hons in History from the University of the Witwatersrand, in Johannesburg.

While the primary focus of my research pursuits thus far have been in the domain of collective memory, archiving and meaning-making processes; I am excited to explore the shape that research takes in the education space.'

www.globalteachers.org

