JFAC S4 Ep.7: What does VR have to do with fighting fires?

Tebogo Mokwele: [00:00:00] Simulation led training stems from the challenge of achieving widespread skill transfer, uh, to career seekers employees without incurring the high financial and resource costs, including the risks associated with it. So with that in mind, you know, when we use a simulation as a training environment, we're just allowing the trainees to be able to experiment with processes and tasks that are difficult or somewhat impossible to replicate in the real world.

Ntombini Marrengane: Artificial intelligence. Augmented Reality. Virtual Reality. These words probably conjure up visions of avatars floating in the metaverse or space age scenes. But did you know this technology is also helping to train people for tasks very much rooted in the real [00:01:00] world? And these skills can help create opportunities and bring about positive social change.

SA Forestry YT Clip: Chainsaws are powerful and highly dangerous tools. Many growers are reluctant to allow inexperienced trainees into their plantations for the practical component of chainsaw training programs due to the safety concerns. FSA with industry partners has developed a virtual reality training application for train saw operators.

A world first. The app provides training service providers with a cost effective tool to make chainsaw training more accessible and safer.

The app bridges the gap between the training room and the actual plantation by creating a virtual forest.[00:02:00]

Ntombini Marrengane: We've just heard about an app developed by Forestry South Africa to train chainsaw operators in a safe, simulated environment before using a real power tool on a tree. This kind of approach, to harness tech for skills development while reducing danger and boosting productivity is increasingly being used in everything from welding and carpentry to firefighting.

Just as virtual reality allows these artisans to rehearse their movements and responses without real life risks, it can do the same thing for the softer skills too. VR can create realistic scenarios to practise communication, public speaking, customer service, or conflict resolution.

PwC US YT Clip: When you're in a group, you don't want to expose yourself. You don't want to expose your biases. You don't want to expose your blind spots and that can be something that's very difficult to talk about. In the virtual reality [00:03:00] setting, that inhibition is often removed.

I think sometimes we default to the safety of saying nothing versus, you know, putting yourself out there and saying something.

Ntombini Marrengane: In a PricewaterhouseCoopers study of VR designed for soft skills training, the results showed that VR learners were four times faster to train than in a classroom, almost three times more confident to apply their new skills, and almost four times more emotionally connected to the content than classroom learners.

In countries with large skills gaps, this kind of technology could bring opportunities for growth in almost every sector.

Welcome to season four of the Just For a Change podcast, powered by the Bertha Center for Social Innovation and Entrepreneurship. I'm your host, Ntombini Marrengane. In this season, we're looking at unexpected connections, surprising overlaps, and unusual alignments in the work being done locally and globally that's moving our societies forward in positive ways.

[00:04:00] Just a reminder that the views shared by our guests may not necessarily reflect the views of the Bertha Center. As a refresher on the acronyms we use in this episode, virtual reality or VR creates virtual worlds that you can move around in. VR relies on specialised headsets and software to achieve this illusion.

Augmented reality or AR overlays digital elements onto the real world. Think of furniture virtually placed in your living room or applying a filter to a photo on your phone.

And finally, artificial intelligence, or AI, refers to the intelligence demonstrated by machines, often achieved through algorithms and machine learning.

It's way more than just chat GBT. And you've already been using it for years in your banking app, music streaming platforms, and map service. VR and AR provide a stage, and AI helps to bring the virtual world to life. All of these [00:05:00] technologies together are grouped under the term Extended Reality, or XR.

In this episode, we'll speak to Tebogo Mokwele, an alumnus of the E- TRAC program for high impact entrepreneurs launched by the UCT Graduate School of Businesses Solution Space.

Tebogo will share more about how immersive training environments can help companies to transform and build a more inclusive society. But first, let's hear from Dr. Jason van Staden.

Jason van Staden: Hi everyone, my name is Jason van Staden.

Ntombini Marrengane: Jason is a Project Manager of Research and Training in the Bertha Center's Innovative Finance Portfolio.

He completed his doctorate in Business and Management at Wits University, where he also lectured and did a postdoctoral research fellowship. Jason has founded two tech based startups, hoping to use his skills, knowledge, and experience in research technology and finance to bring impactful social change.

I asked Jason to tell us more about innovative finance in South [00:06:00] Africa and XR's role in this kind of solution that can bring about much needed social change.

Jason van Staden: Emerging technologies have paved the way for greater accessibility and opportunities for learning for underserved communities in Africa. For example, AR can be used to better assess credit scores and financial risk.

M-KOPA, an asset financing platform for the underbanked, uses AR to manage lending risk and financial forecasting. The use of AI has helped improve its customers' repayment performance and allowed them to extend further credit. Using AI interventions to improve risk assessment allows for underbanked customers with little credit history to potentially access finance.

VR and AR can also be used to improve financial literacy through richer and more engaged learning opportunities. Emerging technologies provide an incredible opportunity to unlock finance to drive positive social change in Africa. It is important we strive to create an enabling environment [00:07:00] to adopt these technologies to experience its full potential.

Ntombini Marrengane: It's fascinating to hear about the possibilities that advanced tech can bring, provided we have the financial tools and support to back it up. To tell us more about how immersive technologies are transforming the business world in South Africa, I'd like to welcome Tebogo Mokwele. Tebogo is the founder of Monobyte Group.

This venture acceleration and capacity building program is for high impact entrepreneurs in South Africa and beyond. Tebogo certainly fits this bill with his work in solving skills gaps in the workplace using advanced technologies and XR. Thank you so much for joining me today, Tebogo. It's great to have you here.

Tebogo Mokwele: Thank you, Ntombini. It is also a pleasure to be joining you this morning.

Ntombini Marrengane: Please tell me more about your work as a high impact entrepreneur. What has your experience been like so far?

Tebogo Mokwele: My experience as an entrepreneur has been challenging, [00:08:00] inspiring, and, uh, deeply satisfying at the same time. Just to provide a bit of context, the challenging part of it comes from, you know, having to explain, uh, the technology that we use to, uh, the audience or to users that have not been exposed to it before.

So we obviously start by ensuring that we educate the users on the technology first before we can demonstrate its uses and potential benefits to them. But most importantly, the satisfying aspect of it comes from witnessing the behavioural change from the users when they start to realise and get the benefits of adopting this technology.

So, so just seeing that behavioural change and the satisfaction from just from their faces becomes uh, you know, bring sense of joy to us.

Ntombini Marrengane: Take us back to the beginning. How did the idea of Monobyte come about?

Tebogo Mokwele: This idea came like a long time ago, the origin of it before it was Monobyte, many, many years ago, I was, uh, [00:09:00] in high school, I was a student and at the time I thought I wanted to explore a career as a channel accountant, mainly because some of my strengths is maths and accounting and economics and so forth.

So one day I went to one of the big four films uh, trying to get an understanding of a day to day, uh, reality of being a CA and I realised then

that that was not aligned with my expectations of a satisfying job. And that experience was further solidified when I went to varsity pursuing, you know, become accounting.

And it became clear that what I thought the career entailed is not entirely what it is in reality. But then of course, there was no other way of knowing. Until you actually can do it back in the days and then that made me start to ask myself certain questions, such as trying to find a way in which I could explore various careers before making any commitments in terms of.

Uh, registering for a, for [00:10:00] a course or, or, or, you know, taking up a job and at the time my research could not yield me any positive results. So it's nothing that I could find at that time except websites. And then, you know, since then I just obviously started to ask myself, how come we don't have things that can allow, you know, students, career seekers to spend a day or two in the shoes of a lawyer, a doctor, an accountant, whatever the case may be before one can make a choice.

And through that, there was a lot of research that I was making at the time. That research led to an adaptation of various solutions, which led to where we are now. My first venture was using animation. where we're trying to animate, uh, you know, office based training scenarios. And then there were some successes there.

And there was just one thing missing in terms of putting the user in the shoes of that particular, you know, profession and, uh, through research and understanding [00:11:00] the changes in technologies, then, you know, eventually we got to where we are now.

Ntombini Marrengane: Monobyte combines realistic simulations, interactive experiences, and AI driven feedback for skills development.

Why is this kind of training needed?

Tebogo Mokwele: The training or the simulation led training, uh, stems from the challenge of achieving widespread skill transfer, uh, to career seekers employees without incurring the high financial and resource costs, Including the risks associated with it. So with that in mind, you know, when we use a simulation as a training environment, we're just allowing the trainees to be able to experiment with processes and tasks that are difficult or somewhat impossible to replicate in real world.

Now, lately, with the, you know, [00:12:00] the enhancements you've seen in the AI space. We're able to even integrate the two way communication between the trainee and the virtual environment, as well as enable an immediate feedback loop. You know, typically when you go to, when you go to a training, they train you, you run an assessment at some point, other parts will fail.

And it would be nice for me to know as I'm learning, where am I lacking, so that I can fix that immediately, as I'm learning, and become better at it, instead of waiting for the exam date and only you get my results then. So this type of training enables all of that and many other benefits.

Ntombini Marrengane: How did you go from cartoons to VR? What was missing with the cartoons? You said there wasn't the two way communication, but how, almost how immersive is it?

Tebogo Mokwele: The difference between using animation and the immersion is that when you're using immersive experience, you're enabling the user to [00:13:00] physically be in the shoes of that particular character that you're playing in this case, since we're speaking about the careers instead of watching the animation of a doctor performing an experiment, for example, then you put on the VR uh gear, and then you yourself, you are in the shoes of a doctor and you're the one that is performing the operation if it's an operation, you know. So that's the, you know, the shift from while we moved from the animation to the more of image, imagine, because now we were trying to solve the issue of a person watching a video tutorial and instead of watching rather have you perform the job, you know, you learn better when you do the things instead of just watching. I don't know if that makes any sense.

Ntombini Marrengane: It, it does make sense, but also it's a bit scary because to think that someone who has just, uh, completed school wants to know what it's like to be a physician [00:14:00] or wants to know what it's like to be a chemist. And then suddenly they have the access and the power within this VR environment to actually try and do things. Um, it must be quite an experience.

Tebogo Mokwele: Yeah, well, indeed it is. Luckily, we have various modes. There's a learning mode, where it assumes that the user does not have the theoretical background in that subject matter. Then you have the assessment mode, where you would have done some things in those, that profession prior and then now you want to assess your skills if you can do it.

And there's a collaboration mode. There's quite a number of modes that a user can learn or can use rather. The idea is that as a high school learner, it will be to take you through the life of a doctor, if you want to be a doctor, of course, or in a profession, but without exposing you to the detailed intricacies of it, because you may not be able to, to have the context to understand in the first [00:15:00] place.

Whereas, as a university student, the exposure which you'll get will be completely different from a high school person, because now you're studying medicine, you're in your second or third year, and then you now have a bit of an understanding.

So what this does is, sure, you can still use a real human being for the purpose of what you need to do. But if you want to go further than that, then you now can use VR to explore all the tissues inside the hand without cutting anyone and get more in depth understanding on how does, how do the veins and the bones and the whatever that is inside connect together and how do they work. So it really depends on what you are, where you are currently and what your goal is.

Ntombini Marrengane: At what point did you realise that you needed to have different tiers of training within your simulations?

Tebogo Mokwele: Before starting all of the work we do at Monobyte, I was once employed as a, you know, program coordinator at a university here in the Western Cape and uh, in [00:16:00] that, during that period, I've learned a lot in terms of skills transfer, especially digital skills transfer, where one has to take into account, you know, who are you training or who is the cost

supposed to be tailored to, what are the goals, the benefits and how are we going to measure success.

And in so doing, I mean, at the time we're training from first year students right through to post grad students in terms of the program, the program that I was managing or coordinating, um, his focus was more on taking, you know, traditional learning and take it to the digital environment. So there's a lot of lessons that I've learned during, during that time.

And then, of course, in addition to that, when you're developing any solution, you always have to put yourself in the shoes of a user and you ask yourself, you know, what if, what if this, what if that, like some, what if analysis.

So taking all of these things into account and just like a general approach in terms of when you're building any solution that you have to be [00:17:00] more user centric.

It was quite clear that it has to be designed in layers in terms of the assuming different backgrounds of the users, someone who doesn't know how to use VR at all, someone who's in high school, someone who's just, you know, they're not interested in anything, they just want to see what's happening, someone who is already in the working environment, working for a corporate or wherever they might be working.

And also I needed to know the limitations. What can I not do with VR at this stage? taking all of these things into account, um, it was then, you know, easy for us to draw a user mapping process and have better solutions for, uh, different users.

Ntombini Marrengane: How is this similar to real world internships and training and how is it different?

Tebogo Mokwele: Some of the similarities come from the fact that, you know, when you're doing a real world, um, internship, you do have some element of practical experience. [00:18:00] The users are exposed to, you know, the ability to apply theory in a practical manner, following processes or other cultivating theories into practical scenarios while you performing a task.

And the second one, um, there is an element of skill development where one can come with a certain level of skill set and the tool can enhance it in the same way as you would if you were in the real world, uh, leadership or, or, or internship. And in terms of the differences with XR or VR training, obviously there is, you are in the virtual environment, not the physical one.

So the environmental or the environment differences, you know, uh, notable to some extent in a sense that when you're in the, in the real world. There are certain things that, you know, could come up that one could not have planned for. Whereas in the virtual environment, everything is [00:19:00] sort of pre-designed there, there are no areas of, uh, you know, surprises, so to speak.

Ntombini Marrengane: Are there any pitfalls to XR training? Don't we lose the human element?

Tebogo Mokwele: Yes, indeed. There are pitfalls uh, there's quite a number of them. The first one, like you said, is the whole, the one that pertains to

the reduction in the human element where, you know, the technology can isolate you because you are now in a, your own world.

Yes, there are other virtual participants also, but our mind can only be, for the lack of better word, fooled to a different, to, to a certain extent. At some point, the mind will always know that this is not entirely real. The person I'm looking at is not a real human being, it's a digital human being. I think those are some of the pitfalls that are common.

Ntombini Marrengane: Which sectors are using XR training the most at the moment, and which sectors are not, but could really benefit from it?

Tebogo Mokwele: So, we've seen, uh, great developments in the mining and [00:20:00] energy space, where they're using XR training to simulate the training of their workers to prepare for dangerous environments that otherwise they would have not been able to replicate in the real world.

In healthcare, as I've mentioned earlier, that, you know, when you are training someone how to perform a diagnosis or do whatever it is, you better off using a digital person than the real human being so that you don't harm other people while you are trying to train someone else. And in terms of the sectors where we've not seen it being adopted, or at least not fully, uh, is agriculture.

Um, there is some, but limited use in the tourism and hospitality space. Uh, in retail, you know, when you go to a store, there's a fitting room you go into, you put on the clothes, you try them out? so you can use your mobile

device, AR or augmented reality to try whatever item of clothing while you're at home, but [00:21:00] not going to the shop itself.

So, there has been some use cases in that space, but I've never seen them being widely used in a retail space. So just some of those that I can see, I can think of top of my head.

Ntombini Marrengane: Do you have any results or stories that you can share with us where this has really worked well in South Africa?

Tebogo Mokwele: Well, yes, I can start with our own story, our own results. So we work with a number of other organisations, NGOs, uh, private companies, sub government sectors, and so forth. So we've partnered with one of the NGOs where we're collaborating on delivering a project with the MICT SETA. The learners were doing a system support simply mean that they learn the theories on how to fix computers, connect the network and the servers and so forth.

And, uh, then they typically get assessed and then they go to do the, they go to do their practicals uh, and then that's normally where the, the line ends. So our involvement there was to, [00:22:00] after they do their theoretical training, we then take them to the virtual environment where they, they put on the VR headset.

Instead of just learning theoretically on how to put a network, they can, they can digitally set it up and test it and see if it works. So there has been a number of successes uh, of our own, as well as obviously some that I've seen, uh, externally.

Ntombini Marrengane: It sounds like this technology represents a quantum leap in skills acquisition. And I'm wondering what is the opportunity for this in developing countries like South Africa with our high unemployment rates and big skills gap, is this kind of tech accessible?

Tebogo Mokwele: I think for a country like South Africa, it is much more relevant in a sense that we have, uh, the high unemployment rate, like you said, we have a skills gap and so forth.

So when we're trying to, to close that skill gap, especially between certain, uh, [00:23:00] socioeconomic groups, you would want to allow the trainees, the learners, the students to have sort of exposure to similar type of tools. There are still schools where, you know, they don't really have infrastructure to perform let's take science, for example, so teams have to experiment because the infrastructure is just not there. Um, and then we're using tools like this can close that gap whereby whether your school have a real lab, or not, we can still have, uh, uh, uh, get the learners being exposed to how to perform those scientific thing, you know, using tools like this, enable people to just, or job seekers to acquire skills much faster.

Um, and I think lastly, we can use it for skills transfer. If I don't know how to make a table, for example, and I would like to pursue that career or that, uh, it's a, training or course, I could do that without [00:24:00] having to, you know, to use real, uh, resources, wood and all the equipment that is required.

So from that perspective, I think it can help us to, to close that gap, both from training and skill transfer point of view.

Ntombini Marrengane: What do you think the risk is for us as a country if we don't embrace this kind of technology?

Tebogo Mokwele: The first one is the widening skills gap. We're always going to rely on getting people getting employed first before they can get the skills so the skill gap will keep growing, I would imagine.

And then of course, there is that aspect of lost economic opportunity, which, you know, each time there's a new technology, there's two things that happens. Number one, the people that can, you know, grow and develop and, and, and sort of implement the technology itself with any new technology that we tend to see the creation of new jobs or new roles.

Enhancement of existing roles, you know, so, so that, that is a potential, uh, [00:25:00] uh, loss that we could be suffering. There is, um, innovation stagnation, I mean, we don't really want to be the country that is stuck with, you know, a hundred year old technologies that, you know, and our counterparts have progressed to other things or to other new refined tools and technologies.

So we'd want to be able to have innovation or foster innovation in our country that typically also enables startups and other small businesses to want to enter the market.

Ntombini Marrengane: How do you think this kind of technology helps to alleviate social inequities?

Tebogo Mokwele: I think at first, I mean, it provides, uh, an equal playground for communities, whether I'm in a rural community or I'm in the urban community.

I'm sort of, it provides that, it sort of provides that equal landscape for us to be able to, you know, um, participate from whether it's through education, it's through career guidance. So this type of [00:26:00] technologies provide a sort of an equal foundation and a ground for everyone to be able to participate in the economy, no matter where you are, no matter, you know, your background and so forth, we all have the same chance.

Ntombini Marrengane: And what role does collaboration play in your work? And are there any unique partnerships that have come up that you perhaps didn't anticipate when you started?

Tebogo Mokwele: Collaboration in this space is key. We got to where we are now, and I think we still have a number of milestones to achieve, uh, because of the collaboration we have with, um, you know, the government agencies, with the NGOs, local NGOs, and NPCs. The likes of the solution space and GSB.

Um, as well as some tech giants that are helping us like Microsoft and AWS that give us the, you know, enterprise grade infrastructure from which we build our, you know, our solutions on and be able to scale it across the continent and beyond. [00:27:00]

Ntombini Morrengane: You've given us a lot of examples of how XR benefits the user or the, the trainee as it were, but can you explain to us how XR might help with talent acquisition and improve companies BEE ratings?

Tebogo Mokwele: So I'm here to ask that because our business model targets companies that wants to increase their triple BEE rating. And how that typically work, you know, for talent acquisition or increasing the rating and so forth is often companies have their corporate and social responsibility budget that is geared towards things like job curation, education, uh, skill development and so forth.

And when the companies take on projects or fund projects from that point of view, projects that are uplifting education in the communities, projects that have some [00:28:00] social economic benefits, you know, uh, in that space. So when companies approach it from that point of view, we're able to still use the same tool to align it to their CSI goals/CSR goals.

And additionally, we have accreditation, meaning our solutions have a QCTO component where we've aligned to the QCTO because we understand that we can't just provide random training and then expect miracles to happen. It still has to have or meet certain quality standards, so to speak, and as far as talent acquisition is concerned, you know, we have tools that helps the learners or the career seekers rather, number one, to explore career opportunities at a whole lot of corporates, which is accessible through their mobile device.

They don't have to buy the VR gear, and the tool will have an interview preparation, if you may, like a mock interview, to help you prepare [00:29:00]

sufficiently for the real interview. It also helps the companies to not only assess someone by the high school grades or whatever other measures, but to give you a virtual opportunity to perform tasks and complete them, to ensure them that you can do the job that you're applying for.

Sometimes you find that career seekers may be limited due to, uh, communication. They might struggle to explain themselves quite well, even though they can do the job, also consider skills holistically. The person may not have went to a great university, but perhaps they have acquired the skill on how to do whatever the task requires outside of the university environment.

Ntombini Morrengane: It sounds like you've had an incredible journey, um, building this business. What have been some of the highlights of your journey in this space?

Tebogo Mokwele: For me, depending on, you know, obviously like how we look at it, the first one was to have a uh, you know, that project [00:30:00] to contract where we're delivering concurrently for a multinational telecoms company across four provinces.

It, it helps us to learn how to scale quickly. In addition to that, we've had a, the opportunity to get our materials, some of them at least, uh, to go through QCTO process where we can deliver training solutions, which will culminate in a learner receiving a, an accredited national certificate or high certificate, depending on the course itself.

So which then helps us to work closely with the corporates that uh, driving, you know, or aiming to achieve the triple BEE points like you've mentioned earlier. And, uh, we've also have experimented solution within the MICT where learners are, they learn theoretical aspect and now give them the opportunities to apply the skill in the leadership.

And then of course we've won a number of competitions and that led to us getting, uh, partnerships with the likes of Microsoft, uh, [00:31:00] AWS, uh, Meta or Facebook and the list, the list of those partners goes on. Even today, we still have strong partnerships that are supporting us to, you know, be able to, you know, sustain our operations.

Ntombini Morrengane: I'm sure you've also faced some steep learning curves. Can you give us an example of a significant challenge and how you've overcome it?

Tebogo Mokwele: The number one challenge that we have experienced so far is our own talent acquisition for us to get good engineers and other resources that we need to, you know, help us build what we're building.

It has been a bit of a challenge in the sense that we find that, you know, we're looking for someone that has a certain combination of skill sets, technical skill set that can help us build the solutions. And the limitation there is sometimes, you know, people have one of the two, they can code, they can, you know do computer science, coding and so forth but when it comes translating into XR [00:32:00] development or creation, you know, we're struggling to find the right fit because the work that we do, sometimes we experiment first and see if it works before we can go and

not get a possible client's job. So if we're not aligned in terms of our values, in terms of our beliefs, you know, um, things like that, it becomes then difficult to work with just anyone.

Ntombini Morrengane: Tebogo, now I'd like to ask you a question that we're asking all of our guests this season. And that is, why do you do the work you do and what makes you hopeful?

Tebogo Mokwele: I enjoy solving problems that have potential of benefiting society at large. So overall, and you know, with the emergence of technologies like AI and VR, AI and AR and so forth, you know, it just makes this process much more impactful and scalable.

Like it's, it's, it's much more, we can do it at a larger scale, so [00:33:00] to speak, and that fuels my optimism for the future in terms of with all these technologies coming. I'm sure there's a whole lot more that we could do for the upcoming years.

Ntombini Morrengane: And what does social innovation mean to you?

Tebogo Mokwele: Social innovation to me means, you know, I suppose curating or developing creative solutions that addresses society's most pressing challenges.

And doing so by, I suppose, stepping beyond the traditional boundaries and methodologies of creating such, um, impactful and sustainable solutions. But I think most importantly, it involves a whole lot of changing the systems and practices that would culminate in the improvement of lives for the long

term goals that, you know, could benefit the society and [00:34:00] communities at large.

Ntombini Morrengane: Thank you so much Tebogo for sharing your story with us and for letting us learn more about cutting edge technology with you.

Tebogo Mokwele: Thank you. Thank you so much for having the chat uh, through the podcast and, uh, we'll be looking forward to chatting again in the future.

Ntombini Morrengane: In this episode, we've seen how VR and AI are not just about fantastical future scapes. They're powerful tools with the potential to revolutionise training and development, bridge skills gaps, and empower workforces on the ground. The future of immersive training is bright and with continued innovation collaboration and financial support it could really change society for the better.

Thank you for tuning into season four of the Just For a Change podcast, powered by the Bertha Centre for Social Innovation and Entrepreneurship. If you're interested in hearing more about unexpected connections, then make sure you subscribe to this [00:35:00] podcast so that you don't miss any of our upcoming episodes.

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