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Firstly, Robert Kotter, we have you today with us discussing on one of the important topics in today's time, which is making researchers ready for the future. And you being one of the co-founders of TwentyOne Skills, which is working and striving really hard to make researchers life easy and making them, you know, efficient enough and being ready for the future, it's happy to have you here. It's an honor, honestly.

Thank you so much for inviting me. I'm really looking forward to this. Definitely.

So, coming to the main topic of our conversation today, for what we've met, I would like to first begin with addressing the main challenge. That is the research landscape is transforming at an unprecedented pace that we all are aware of, driven by rapid technological advancements and a growing recognition of the value in interdisciplinary collaboration. In this era of constant disruption, the skills that have traditionally defined a successful researcher are no longer sufficient.

I believe, and I hope you also agree to what I'm saying. And to remain relevant and impactful, researchers must proactively adapt and expand their skill sets. To align with the evolving demands of the field would involve cultivating growth mindset, embracing cutting edge tools and methodologies, and developing probably a diverse array of competencies that would transcend the boundaries of their specific disciplines.

Speaking of having to adapt to these changing dynamics, I wanted to address how would you define as to how can researchers adapt and solve these problems and constantly keep on with the pace of the developing times? Yeah, great question, Uttkarsha, and I think you are really putting the finger in the wound, right? So the world is evolving, science is evolving. And right now we are working with so many different institutions, so many exciting scientists, and let me tell you, like, I really truly believe that science is going to make the difference, that science is the one biggest option we have to solve these big issues that we're facing today, starting from climate change to hunger to war. All these things are decided in the field of science.

And the scientists we have are the brightest minds in the world and they really care about these bigger topics. So what I really see, especially with the early career researcher, the PhD students, the postdocs, that they are driven by a deep willingness to change the world to make it a better place, to put their mark on the world and do something about it, to do this, we can no longer think in these disciplinary and institutional boundaries. So this is one of the biggest struggles that science is facing, that the organizational setup is really thinking, how can we make Harvard more successful in comparison to the other universities or in our Institute of Technology, better than this one.

But the young scientists, they want to transcend these borders, the borders of disciplines, of institutions, of countries. And it's like Covid showed us, it's a transnational, transdisciplinary struggle. To excel in this, you not only need to be an excellent researcher, this is the base foundation of this.

Of course, to have good scientific practice, to know your methodologies, but you need so much more. You need communication skills, you need leadership skills, especially in non authoritarian ways. So you're not actually disciplinary leader, but you're a project leader.

You need agile skills to make things move faster than they are in the traditional academic workplace. And you need to grow empathy, you need to grow emotional intelligence. So actually as a baseline, Uttkarsha, what I'm saying is an academic journey is also actually inner work.

So it's about developing yourself as a human. And if you do this and you work on your soft skills, what I think are more future skills, you're actually not only enabling science to tackle these big issues, but you're also preparing yourself for a great career. And be this in science or outside of science, or working with science, because you need these skills everywhere in the future.

Definitely. And I agree to every word that you just spoke. And as we speak of the changing times and researchers having to adapt, I would like to put it like adaptation.

Adaptability has never been more crucial for researchers than it is today. Right with the pace of technological change, which is pretty dizzying because every morning you wake up to a news which is disrupting the industry and you'll, you go back to seeing, oh, this wasn't the same case yesterday. There's everything new that's coming up which is totally disrupting fields.

For example, let's talk about the AI model, ChatGPT, which has totally, you know, brought in a massive wave in field of natural language processing in a remarkably short time, irrespective of you be a researcher or someone who has been following AI for a really long time or otherwise. I see every person, students even going to schools and colleges using ChatGPT like it's some, I don't know, it's, it's like a pen and pencil for them right now. So it's very accessible, which is good.

But when we talk about scholarly communication and when we talk about researchers having to adapt to these AI technologies, specifically, let's talk about how why developing AI related skills is not negotiable nowadays. I know some researchers still have reservations about AI. Being an AI ethicist myself, I have come across a lot of researchers in my interviews or whenever I have dealt with them in terms of understanding their problems, conducting several surveys, in a way, they have constantly perceived AI to be a threat to human cognition.

But the reality is AI is already deeply embedded into virtually every domain these days, be it biotech, material sciences, you name it. It's everywhere, right? What we need to focus on or what we need to typically train researchers is to understand the fundamentals of AI and not struggle into, you know, using or completely depending on it, but however, use it responsibly. So what is, what are you, what is your take on it? What, how should researcher dive into AI and, you know, embrace AI in a more positive manner than they are currently doing? Yeah, it's an excellent question.

Of course, at the heart of the biggest issue in academia right now, I think there's a lot of smart things being said about this in a very general way. So I want to be very specific today, Uttkarsha, and give a very timely example. So last week a new paper came out.

I will put it in the show notes or ask you to do it. Very amazing research setup. And I discussed it with several professors from international institutions this week.

It's really exciting because it basically showed that writing your introductory statement for a scientific paper and then checking whether the AI written one or the human written one is better understood showed that AI is performing just as well, even slightly better than humans. So it makes an introductory text for paper easier to understand. And now this is of course a big help for researchers to use this to say, hey, we are doing the research, AI can't do it yet, we are giving the great results.

But to make the paper more accessible, we use the help of AI. And to put it one notch further, in our discussions, we really talked about, okay, accepting this, and this goes for many parts of our work, you know, and not only writing introductions to our papers, but also writing the papers themselves, writing grant proposal, writing emails, and then also image creation, data mining and so on. The the question is, and I think this is at the heart of the concern of many researchers, where's the human part? So looking at other studies on academic writing to compare this to, they really point out that writing, in a kind of general way, the AI is very good at, or even better at replicating these rules.

You know, clarity, easy structure, explain technical terms and so on. But what scores the best all over academic writing is surprising writing, personal writing with stories with. With surprising turn of words.

AI can't do that yet. You know, it's not very good at creating surprise. But we, as humans, we can make people want to know more about our research by surprising them, by finding a different way.

And I'm really, really pushing researchers everywhere and I have a lot of supporters in this field to go away from standardizing everything. You know, every paper looks the same, every paper has the same boring introduction and the same methodology. And most researchers, to be honest, when I talk to them, do you actually read these papers? They say, well, I just scan for, for the one paper that's relevant to me and then I look deeper, but everything's just so the same, you know, and that's all the rules and the regulations have FL really made it boring.

So I think this is at the heart of the issue. Human AI collaboration. Use it for the boring part, but then use your creativity, use your empathy, use your storytelling skills to make it stand out, to make it relate to humans, to make people care about it.

And this is where researchers have to hone their skills. After decades of international researchers working in English, not often they're native tongue, more often than not they had to learn a new language to do this, but then kind of following the rules to create always the same kind of structure, always the same kind of paper. So with these future skills of creativity, of critical thinking and of storytelling, you can really make a difference in a world that's more and more streamlined.

Very necessary for researchers to understand how, how they responsibly use AI and use it the right way. Just because it's available out there doesn't, you know, it is pretty inescapable and we need to go with the times and accept technology as it comes to us. But it is again in our hands to understand where to draw that line in terms of how should we use it in that case.

I think AI literacy is honestly just step one. Like you mentioned, the real far move is actually utilizing cutting edge AI tools that are available even for researchers and for scholarly communication. I'm talking using AI to automate tedious tasks.

Like you've mentioned already, the repetitive task, the tedious task, probably correcting your grammar using technological terms, correcting citations, or you know, ensuring that, you know, you are submitting to the right journal, for instance. And then you need to have your critical thinking, you need to have your critical analysis that goes behind it and then incorporate it in what AI has delivered to you. Complete dependence on AI is something that will not take us farther.

And like you said, science in itself is a very deep field. It's a field of thinkers, right? And if we stop thinking, then God knows who Will so absolutely, yes, absolutely. A wonderful point that you made.

Speaking of again, making our researchers ready for tomorrow, ready for the future to come, how would you think, should researchers be skilled when it comes to AI? What kind of steps should they take personally in terms of keeping their self updated with the technologies? Like we also mentioned earlier that every morning you wake up to a new news, every morning you wake up to a new disruption and it's evolving at a warp speed. I would say in technological and AI terms if I would use those. And so what do you think should researchers actually do? Because we have a spectrum of researchers ranging from early career researchers who are pretty much okay with embracing AI, which they also think is helping them in again with their tedious tasks, with their repetitive tasks and kind of making things easier for them while they're also doing administrative work.

However, researchers who are experienced, who are, who have been in the industry for a really long time, for them adapting to technology sometimes could get a little difficult. How do you, how would you say that, you know, this is the way that you can as at whatever path of your career that you are in as a researcher, how would you upskill yourself in terms of developing or you know, making yourself better in terms of AI? Because as we said, AI is bound to happen, it's inevitable. So what are your thoughts on that? Right, so let me start with some data on this, Uttkarsha.

So it's always good to give some concrete numeric examples. So we run one of the largest upscaling platforms in the world. So we have scientists from over 100 countries there.

And what we can see is no matter your status level, no matter your age, the AI classes are the number one classes overall. So there's a big need for upskilling. And I think it's a very smart way to, you know, with an academic mindset with the researchers.

Curious mind to first start from the safety of your workplace or your home, you know, to do a non synchronous upskilling, you know, whether be it elearning as in our platform or like YouTube or the other channels that you can do. And I think as one of the skills of like the meta skills of the future is also understanding your own strengths and weaknesses, being very honest about it to yourself, getting feedback from others and creating kind of like skill profiles to understand which area do I want to invest time in and to put it into your calendar. This is like for all the researchers out there, don't only do the research, put in the time, write down in your calendar four hours per week for my personal upskilling.

This is vital for your scientific success, but it's also vital for your next career move because people in the industry, you know, if you go to a non academic career, they don't look at your publication, they don't look at how many hours you put in teaching. They also want to see how did you upskill yourself, how did you learn new stuff? And next to these like non tangible areas like emotional skills or critical thinking that we were talking so much about. Uttkarsha I think it's really also one big factor is technological upskilling.

And this has two sides. This is like the practical skills, like a language, like how the model works, you know, getting into the technological part of it, but then again also like a critical understanding of how can I use it, what are the boundaries, which tool to use for what parts. So in a scientific life there's many different aspects where we now have very powerful tools specifically for this task.

So like don't use ChatGPT for research on papers. You know, that's, it's not its strong suit. You know, it's very good at writing an email for you, but it will hallucinate in finding references.

So there's specialized AI tools for this. But on the meta level, really take time to upskill yourself. And especially this is like advice from me personally, go where your fear is.

So the more you dislike AI, the more you feel this is not you, the more you should learn about it because this normally points you in the right direction. And this holds true for personal upskilling as a human, but also for technological upskilling. If you really resent the technology, investigate, use your researcher's mindset, make a hypothesis, study this hypothesis like AI doesn't help me at all.

And then research on this hypothesis and find proof for this. So it's not like an opinion, but it's actually academic fact that you can create for yourself. And this is what I tell researchers you are great at, you know, as a scientific pathway, creating hypotheses and checking them and then continuing do this for your own upskilling as well.

Yes, absolutely. And from what you have mentioned, I can say is we just need to get AI built, utilize the current AI tools available, understand the intricacies that go behind it, not to the probably technological terms because that's not everybody is acquainted with that kind of knowledge. But however, commit to a lifelong learning on this front.

You can never be, you know, completely aware of everything that's happening. But you need to keep on the spin and keep Learning on the new advancements that happen in the technological field. Those in my opinion, who fully embrace the AI driven research paradigm, let's say, will be the ones pushing their fields light years ahead of where they are currently.

Because that's how the world is going to propel in the future. And that's what we are looking forward to as well. So, so absolutely.

Well said. And you know, continuously keeping yourself updated with the knowledge and skills related to AI and emerging digital technologies is going to be one of the crucial factors and it is going to be one of the most relevant things to do in terms of upskilling yourselves in the field of research. That was a wonderful conversation, I believe and we have pretty much been able to put forth our word in, you know, laying our message to every researcher out there.

I believe at the end of the day, the research world is evolving at a blistering pace. The skills that make a researcher successful won't cut anymore that did a few decades ago, let's say adaptability, AI literacy, collaboration and be industry savvy. These are just table stakes in let's call 2024.

And going forward, researchers who would want to cling to their old ways could find it difficult. But definitely it's in our hand to ensure that researchers are ready for the future by means of upskilling them and training them with the kind of help that we can offer to them. The people who will definitely embrace long life learning and continually upgrade their skill sets, they'll probably the ones unlocking the next big breakthroughs that propel humanity forward.

I believe so. The future belongs to the curious, the malleable and the passionate ones. So it's for researchers to define for themselves if they are one of these and then take this step forward.

Right, that's so true. And I hope institutions as well as individuals heed this, this advice. Yes, yes, absolutely.

I think it was wonderful having this conversation with you Robert, and thank you so much for your time. It was lovely. It was very educating for myself as well.

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