

### Episode 3: Author Panel on Rehabilitation & Technology [Transcript]

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**[0:00:20]**

**Ana:** Technology and rehab—the future is here. Powerful magnets on a person’s brain can help them move their hand. Robotic seals are promoting social interaction in long term care homes, speech language therapists are meeting with their patients online, prosthetic limbs are being 3D printed. Whether we realize it or not, technology is not only rapidly changing our world, but it’s also changing the way we deliver and receive rehabilitation.

**Kyla:** These are some of the articles in issue 8 of rehabINK. Today’s episode shines the spotlight on the authors of these articles who are our fellow graduate students at the Rehabilitation Sciences Institute at the University of Toronto. Welcome to the rehabINK podcast, where we bring stories of rehabilitation and research to you. My name is Kyla Alsbury and I’m a second-year PhD Student at RSI.

**Ana:** And I’m Analyssa Cardenas, and I’m a second-year masters student here at RSI.

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**[0:01:22]**

**Kyla:** Okay, well thank you all for joining us today, and we're really excited to be here virtually with all of you for the rehabINK podcast. We have some guests with us today we have five authors from issue 8 of rehabINK for this quarantine edition episode, and issue 8 of rehabINK was focused on technology: adapting the future of rehabilitation.

**Ana:** So we're going to start by introducing our authors one by one. So first we have Alex. Alex is a first year masters student in Rehabilitation Sciences Institute, also known as RSI here at the University of Toronto, under the supervision of Dr. Kathy McGilton, she's currently looking at social support and its relationship to discharge destinations in older adults with hip fractures. Alex, do you want to tell us a little bit about what inspired you to write your article for rehabINK?

**Alex:** So my article is about socially assistive robots in particular about Paro—a baby seal, and it’s used as a nonpharmacological intervention for anxiety and depression in long-term care facilities. So, the team I'm a part of with Kathy McGilton is “ENCORE” and it's an abbreviation that stands for ‘enhancing care of older adults’, and a lot of our work is targeted towards long term populations, and specifically, individuals with dementia in long term care. So long term care—is a big topic for our research and use of nonpharmaceutical interventions in long term care is a big research area right now because a lot of pharmaceuticals can have very detrimental effects for people in long term care, and I thought that technology is a really interesting area that's emerging as a nonpharmaceutical intervention for this population, and yeah, it’s also cute robot seals. So that really interested me as well.

**Kyla:** That's great. Thanks, Alex. Next up we have Nithin Jacob, who is a first-year masters student in Dr. Robin Greene's lab. He enjoys working with rehabbing to bring the stories of rehabilitation science to life. Nithin, can you tell us a little bit about your article?

**Nithin:** My article is about rehabilitation technique called transcranial magnetic stimulation. So about 100 years ago, being able to move a person's hand by placing a magnet near their brain might have sounded absurd, but now it's a reality. So, I chose to write about this technique because I think it's a great example of human ingenuity in technological advancements.

**[0:03:59]**

**Ana:** Great thanks for sharing that, Nithin. So next for authors we have Insiya and Kai. Insiya is a first-year speech language pathology research student in the bilingual and multilingual development Lab. Her master's thesis focuses on the predictors of literacy development in bilingual Canadian children. Kai is also a first year master's student in the Rehabilitation Sciences Institute Speech and Language Pathology stream supervised by Dr. Monica Molnar, of the bilingual and multilingual development Lab. Her research centers around the effects of bilingual exposure on the linguistic and cognitive recovery of children post stroke. So Insiya and Kai, can you share with us your motivation behind writing this article?

**Insiya:** So, our article was on some of the limitations and the benefits of tele-rehab within the fields of speech language pathology and mindfulness therapy, and we did this by interviewing two speech language pathologists who conducted tele-rehab in older populations. One of the main things that we found out in this article is that tele-rehab in the fields of speech language pathology does have its benefits but what is needed is more clear guidelines of how tele-rehab can be practiced.

**Kai:** Yeah, that's definitely one of our motivations. We noticed that it was a topic that was interesting to speech language pathologists.

**Kyla:** That's great. Thank you for that summary. I think tele-rehab is even more important in this day of COVID-19 pandemic. So, I'm really interested to hear more about that. So last but not least, we have Vahid Anwari, who is a practicing medical radiation technologist and a Master of Science student at the RSI, currently studying under the supervision of Dr. Andy Kin On Wong of the joint department of medical imaging, University Health Network. His thesis focuses on the use of MRI imaging to assess changes in blood flow inside the bone below the knee joint and how this affects early onset knee osteoarthritis pain. The use of 3D printing in medicine and in rehabilitation settings is another passion of his where he is currently devoting his time towards. Since the COVID-19 pandemic began, he has been 3D printing face shields and reusable N95 prototypes for healthcare workers at UHN. Vahid, can you tell us what inspired you to write your article?

**Vahid:** Thanks for having me. I wrote the article because it was a reflection of the past 8 months that I have been as a graduate student, realizing that there was one aspect in 3D printing that I had

not considered before and it was the rehabilitation aspect. There is a huge need for prototyping and the involvement of robotics in rehabilitation. So, given that I have had that experience with 3D printing, I wanted to give that angle and inform professionals in RSI and rehabilitation in general that there is technology out here that could be used towards greater purposes.

**[0:07:15]**

**Ana:** That's great, thank you so much. I'm super interested in 3D printing and rehab, so I was really excited that you came up with that article. So as you can tell, we've got some very knowledgeable people here with us today, and they're our very own RSI students so we're especially excited about that. So thank you everyone for being here. So let's start off with some questions, feel free to jump in with your answer. Technology is obviously becoming increasingly important in rehabilitation sciences. So I'm curious, how would you describe the state of technology in rehabilitation today in each of your respective fields? And where do you think we're going to be in the next five years?

**Vahid:** Yeah, I think I can answer a bit on that question. It's crazy to think 5 years ahead in terms of technology as every year there is something new that's coming out in every field. I would imagine that in 5 years we would see artificial intelligence having played a significant role in decision making and daily living no matter which profession. I think—that—and also robotics as microchips get smaller or get embedded into robotics, I think those two fields are going to have a lot of active participation.

**Insiya:** I can add a bit to that as well. So in terms of speech language pathology, especially in light of what's happening right now with the COVID-19 pandemic, I feel like a lot of speech language pathologists are now moving to online platforms and there do exist quite a lot such as Jade or Cisco Jabber, some are using Zoom, and in terms of therapy materials provided to speech language pathologists, companies like Pearson are now moving the therapy materials online. What seems to be missing however, and which was further highlighted in our article is actually more clear guidelines for tele-practitioners to follow.

**Alex:** Although I'm not an expert in socially assistive robots in any way, but from what I've read, there's a lot of potential for this research area because they can not only be socially assistive but they can be socially interactive, where they can help their users in pill reminders or appointment reminders, sort of daily tasks, kind of like an interactive minicomputer. But there's definitely a lot more research that needs to be done in this area, especially concerning usability, ethics, safety, etc.

**Kyla:** Yeah, I think sometimes with technology and rehabilitation, there's – I don't know, not necessarily different motivations but different rates of development in private industry versus in research. So it does seem like these robots are pretty commonplace now in long term care homes, but whether or not the research is quite there yet is I guess, kind of the question. But, I think especially with COVID-19 and you know, long term care homes not allowing visitors in those robots are probably providing a lot of support for the residents right now too, which is interesting.

**Nithin:** I was just going to bounce off what everyone said. So I think something important COVID has taught us is the importance of accessibility. So when it comes to transcranial magnetic stimulation, how can patients access this machine without going to the hospital? So in the next five years, probably the next 10 years, we hope to see portable transcranial magnetic devices, where patients can just put on a helmet at home, said, turn on a setting and then just self-administer the therapy.

**[0:11:10]**

**Kyla:** Yeah, that would be a really neat advancement. And actually, you're already thinking along the lines that we had with some of our questions for you, because we were curious that it seems like our society is definitely moving towards technology at a rapid pace, and our question for you as authors is how do we approach accessibility to such resources, especially for individuals who may have financial constraints or less experience or knowledge with technology?

**Alex:** I think age, level of education, and cultural backgrounds in particular have all been identified as factors that affect acceptance of robots in daily life, and I think a way to address that is to obviously involve the users of technology in the design phase of the technological pieces that are being meant for them. So, that way, they become more accessible and easy to understand, I suppose. Especially the cultural aspects because both verbal and nonverbal communications of robots have different interpretations by different cultures.

**Kyla:** Yeah, so the co-design of these technologies is important then.

**Alex:** Mhmm.

**Nithin:** This reminds me of something we learned in our rehab course. Our group was assigned the task of the ethics of designing technology, and one important thing we mentioned in our presentation, our final presentation was that designing technology needs to be proactive—where the user is involved in the process is a reiterative circular process, where there's constant feedback from the end user so that the designers know that their technology will be taken up and not just lost after they meant it.

**Kai:** Something that I noticed in our interview with Sarah Awde, the speech language pathologist, was that, well it was really impressive that she had kind of a system of complete guidance in terms of setting up the video and audio, so every step of the way there was that kind of support for people who were getting her services. So all that tech anxiety that people might have with telehealth and telepractice in general—that was kind of taken care of by her.

**Kyla:** So kind of facilitating the use of that technology making sure that they were set up and ready to use it. So it took away some of the, the anxiety or concern around that, right?

**Kai:** M-hmm.

**Insiya:** Just to add on to that, so when we were actually looking for speech language pathologist interviews, it seemed like a lot of them were working with older populations. Particularly since I feel in the younger populations, so children they're in there might be even more difficulties with administering online therapy, since children might get distracted more easily. So I think finding a way to sort of bridge that gap by having standardized incentives—so after a child is given an

assessment, they actually have a game that they can play, and having shorter sessions, the sort of using technology to provide speech language assessments and therapies to remote communities or communities where there's no speech language clinic, but then at the same time, ensuring that children aren't too tired or too distracted to participate.

**Kyla:** And that way, too, I think you're kind of taking you in or some people have a long distance to travel to go see the rehab professional. So you're kind of, I guess, making the best use of time by, if you have 20 minutes to focus or less that really, you're just focusing on the therapy and it's not taking up a whole afternoon with transit there and back that kind of thing.

**Insiya:** Yeah, exactly.

**Ana:** That's a really great point about having to consider these especially unique needs for each population that you might be working with.

**Vahid:** Yeah I would add that one of the populations that would be really hard to get a hold of or reach out is rural populations, or for example, people that don't have really good access to the internet. We're using internet right now to do this and even in our research study we constantly use email and, you know, internet resources. So I think that anyone that does not have that access it would be super difficult to reach out to them. Especially if they cannot make it to the downtown core for appointments, it adds an additional layer of complexity.

**Ana:** Yeah, it's almost like I wonder if the requirement to have this sort of access to these resources that maybe not everyone has. If-- Do you think that can disadvantage certain people in terms of wanting to get that same sort of care that someone with WiFi might have? Maybe, Insiya or Kai, you can speak to this in terms of tele-rehab. What do you think that means for someone who doesn't have access to WiFi?

**[0:16:37]**

**Insiya:** So actually, before this meeting, me and Kai were talking about how one of the people that we interviewed, Sarah, she's been hosting voice exercises online on Facebook and on Instagram Live. Now, I think that is a good resource because people don't have to download any special technology. But on the other hand, for someone who doesn't have access to the internet or even a computer, how are they supposed to access, for example, speech therapy? Especially since clinics are now closed, the only other option is tele-rehab. It's not like there is a book that they can read on, on how to self-administer therapy as well. Sort of like bridging that gap between technology and then having it accessible to maybe more vulnerable populations.

**Ana:** Right. Okay, so for Nithin: If TMS goes commercial, do you think insurance companies will have access to purchase receipts? And I guess by linking, linking those connections know that you have a certain illness or a reason to use TMS? Just in terms of concern for health information leak.

**Nithin:** So, health information leak is definitely a concern. And if TMS goes commercial where patients just have a headset and administer themselves, the data can go back to the company that made it. But I think that company can be proactive and respect privacy by setting certain privacy safeguards, and one way to do this is to anonymize the data that comes in. Yeah, I think, I think

that's one of the best ways because they can't really say no to taking in data because sometimes the companies providing the technology need to access certain patient information, but for the most part, they can anonymize the data that comes in, then they can respect the patient's privacy.

**Kyla:** Yeah, I think you bring up a good point about data safety and privacy with technology. I know, with the recent increase in use in Zoom in particular, there were some cases of Zoom bombing. So, I'm wondering, in your different areas of research how data safety and privacy is considered for the technology?

**Alex:** I think it would be a very hot topic for socially assistive robots because they obviously need to listen in to what the participant is saying to analyze it. So, the data must be very heavily protected because it can be very personal information that it catches. Similar to like Siri or Alexa listening in on what we say.

**Insiya:** In terms of speech path so, "SAC" which is Speech Language and Audiology Canada, the governing board for speech language pathology, they do have a few recommended HIPAA compliant software such as Cisco Jabber and Jade but for hosting tele-rehab, but they don't have a lot more resources on how to, for example, store data, or shared data. So, when you're recording, let's say, a child's data on a form, then how do you save it? How long do you save it for, is that different than when you're doing it in person? And if you have to share that data with someone, how do you do so in a safe manner?

**Kai:** We were also looking up a couple of video conferencing platforms before we started just as like a research, a bit of research for our article and we found that Zoom it's actually not PHIPA compatible. I think there is like also a lack of video conferencing platforms for speech language pathologists to be using even when we were speaking with Sarah, she couldn't really recommend any that she personally liked or personally would recommend to other speech language pathologists, so that's definitely an issue there.

**Insiya:** Yeah, like with a lot of them, like, for example, Cisco Jabber, the one that Sucheta said she's using there is a limit to how many people can be in a session. So, if you're doing group therapy, that could be a limit as well.

**Kai:** And the CASLPO statement, which is the Ontario governing board, hasn't really been updated since 2004. So, there's definitely work to be done there.

**Alex:** I just wanted to add that it's becoming very evident now when a lot of researchers are trying to move their research online, especially for primary data collection, like a lot of Master's, PhD students, and it's hard to find a platform where you can—that would be approved by the ethics board I suppose, for data collection.

**[0:21:50]**

**Ana:** So I think we may have touched on this a little bit before when, Nithin, you're talking about that sort of co-creation, collaboration aspect that we should all be implementing when we do this kind of research. And I've heard a few times that, you know, technology is rapidly changing so many different fields, including, like, of course, medical imaging, like surgery techniques. But

yet, it seems as though in rehabilitation we're a little slower to implement these things. And there are some unique challenges to having this kind of research in rehabilitation with technology. I was wondering if one of you can speak to how maybe we can bridge this gap between having to collaborate with so many different people, including like the end users or the clients, the rehabilitation professionals, the engineers, like the computer scientists. Have any thoughts around that?

**Nithin:** One effective way that I've seen is the Cybathlon event. So, this event was a 2016 event where they made it a competition. And the teams involved the end users, the designers, the engineers, the scientists. They all had to work together to achieve the same goal. Because of the competition environment, I feel like they were able to include everyone in the design of the technology. So in order to answer your question, how can we address this? Maybe we can have more events like the Cybathlon, where we have teams—consisting of the scientists, users, engineers, everyone—involved in the design process.

**Kyla:** Yeah, I think the tech world does a really good job of that, right? Like there's hackathons, there's—that's all I know about, but I think they do a better job than rehab does. I can't really think of anything that's comparable, but that would be a really neat idea.

**Vahid:** I remember, four years ago, we were working on a project with a bunch of engineers to design this new X-ray system, and he thought that all people have the same lung sizes. Like when I asked him, like, can you make the detector bigger because patients that have longer lungs, they're going to be—their lungs are going to be cut off at the bottom. And he said, 'well why do you need a bigger detector? We all have the same size of lungs.' And then I had to explain to him, like, no, no it doesn't work like that, it's depending on the body habitus you'll have different sizes of lungs. So that was really informative. In his experience, you know, he knew what component needed to go where or what kind of software feature to highlight, but the fact that he was at the hospital learning this was really advantageous for the end users.

**Insiya:** I think it's also important for researchers to also collaborate with clinicians who will be using these tools that we're developing, just so they can give their perspective. Because at times, if we develop a tool, it might be different how we envisioned it and versus how a clinician would actually use that tool and practice it with end users.

**Ana:** Yeah, that's a really good point Insiya. How do you envision incorporating the perspectives of clinicians who are using your tool throughout your research? Maybe you can even include your master's research as an example.

**Insiya:** Yeah, so having a speech language pathologist on board and helping us with testing gave us better insight into how we should accomplish standardized testing in an online environment. The importance of making sure that a child is not distracted, and what sorts of online standardized incentives—so such as having mini games for the child would be important to include—along with other factors that we didn't even think of, in fact.

**[0:25:55]**

**Ana:** So our next question is in your area of research, what is the impact of using technology to deliver Rehabilitation Services versus having a rehabilitation professional, deliver the care? So

maybe Kai or Insiya, you can speak to having that sort of face to face interaction versus face to screen to face interaction. I know. I've been seeing a lot of discussion online with all the implementations of telerehab instead of having them come into the clinic. There can be some challenges, but also some benefits to having it that way.

**Insiya:** Specific to speech language Pathology, some sort of sort of assessments such as in terms of swallowing disorders, they have to be done in person, but in terms of assessing speech fluency, those can be done online. It's just that—first of all, the user is comfortable with using that online technology, and adapting therapy materials in a way that it can be done online. So, for example, with my study on literacy skills and bilingual children, this was originally supposed to be done in person, but due to COVID-19, I've shifted my study online now.

**Alex:** As with socially assistive robots and long-term care, they obviously cannot fully replace human interaction. However, a lot of long-term care facilities are very understaffed, and residents may not get enough interaction from the staff members are very overworked. And like Kyla mentioned, especially right now during COVID they might not be getting any visitors and feeling quite lonely. So these robots can have can be an opportunity to sort of gain a little bit of social interaction, which can be very detrimental for their psychological state. So, they can be quite beneficial in that way.

**Nithin:** I think with advancing technology, it comes out of necessity. I think we've all heard the proverb, “necessity is the mother of creation or invention”. So, I think, at least in the field of TMS, or transcranial magnetic stimulation, there's a need for delivering the therapies without a technician involved, without another person involved. Even though there it's beneficial to develop a therapeutic alliance with patients, I feel like there's a greater need for patients to self-administer these therapies.

**Kyla:** So—some creating some kind of, like, empowerment for the clients to be able to administer some of their own therapy as well, instead of having to rely on rehabilitation professionals all the time for their treatment, if it's appropriate?

**Nithin:** Exactly.

**[0:28:59]**

**Kyla:** Okay, great. So our final question for you all is, we're curious about what has writing an article for rehabINK meant for you? As a published author of rehabINK, what advice can you offer for future authors who may wish to submit an article to our platform?

**Vahid:** For me it was learning how to write to the general public because my first draft was very technical, and it was kind of very dense. So, going through the different stages, I learned how to present that in a way that the general public could understand without taking away any of the important topics.

**Nithin:** I agree with Vahid and I see writing for rehabINK as an opportunity to take complex ideas and write them in layman terms. And I see that as a researcher, this is having the skills beneficial for grant applications.

**Alex:** I think for me, it was a great opportunity to become more confident as a writer in general. And like both Vahid & Nithin mentioned, writing in layman terms, because to me it seems like common knowledge whereas when I got my reviewer's comments I realized how much of the explanation I was skipping that would make the information more accessible to everyone.

**Insiya:** Just to add on to that - so for me, I learned how to achieve sort of that fine balance between including enough information but not too much that it would bore the audience or be too technical in nature.

**Kai:** I think the reviewers do a good job of like letting us know what is needed and what we can probably re-word and re-work for the final article. So just want to give a thank you to you guys.

**Alex:** And I think if I were to give one piece of advice, it would be to not be scared to submit your writing because it can be intimidating, especially knowing that two other people are going to be reading it and judge—not judging it. But that's what we think in our head. And that's what I thought in my head, but getting the reviewers comments. It's really, it really sort of changes your perspective from critical to, I mean from judgmental to critical, evaluation of your writing. So you get very good feedback on ways to improve in a non-condescending or non-scary way.

**Kyla:** It sounds like it was a good learning opportunity for everyone. So I'm happy to hear that. And they were great articles. So you did a wonderful job.

**Ana:** Alright. Thank you to all of our authors for joining us today. It was so interesting to hear more about your experiences and your research areas.

*-chime-*

**Ana:** we hope you enjoyed that panel discussion from Issue 8 of rehabINK. If you'd like to read more about rehabilitation, research, or rehabINK, you can visit our website at [www.rehabinkmag.com](http://www.rehabinkmag.com). Until next time!

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