Episode 170: Larry Rosen

**KL:** Katie Linder

**LR:** Larry Rosen

**KL:** You’re listening to “Research in Action”: episode one hundred and 170.

[intro music]

# Segment 1:

**KL:** Welcome to “Research in Action,” a weekly podcast about topics and issues related to research and higher education featuring experts across a range of disciplines. I'm your host, Dr. Katie Linder, research director at Oregon State University Ecampus, a national leader in online education. Along with every episode, we post show notes with links to resources mentioned in the episode, a full transcript and an instructor guide for incorporating the episode into your courses. Visit our website at ecampus.oregonstate.edu/podcast to find all of these resources.

On this episode, I'm joined by Dr. Larry Rosen, professor emeritus and past chair of the psychology department at California State University, Dominguez Hills. He is a research psychologist recognized as an international expert in the psychology of technology. Over the past 30 plus years, Dr. Rosen and his colleagues have examined reactions to technology among more than 100,000 people in the United States and in 22 other countries. His latest book, The Distracted Mind: Ancient Brains in a High Tech World from MIT Press, won the PROSE award for neuroscience. Dr. Rosen has been featured extensively in television, print and radio media and has been a commentator on 60 Minutes, The Daily Show, Good Morning America, NPR and CNN.

Dr. Rosen has four children including one in the iGeneration, one in the net generation, and two in generation X, and four grandchildren to watch growing up with technology. For fun, he creates works of art from old computer technology, clocks and early rock and roll music. In his free time, he enjoys reading international intrigue novels, fiddling with his newest geek toy, going to independent films and trying to find ways to keep his human-ware safe from the technology vying for his attention. His website is DrLarryRosen.com.

Thanks so much for joining me on the show today, Larry.

**LR:** Thanks for having me.

**KL:** So I'm really interested in learning more about the research work that you've done on technology and the brain, and I'm always curious about origin stories. What got you interested in researching the impact of technology on the brain in the first place?

**LR:** Well, first of all, I've been studying the impacts of technology since 1984 when all we had were large computers and key punch machines. And started off realizing that students in my classes were scared to death to even go into the lab to key punch cards to run statistical programs, and looked around at who was doing this kind of research, and nobody was. There were a few people who had labeled it computer phobia. So we thought, "Well, we'll start there." And so for a while, we talked about computer phobia. We did some research. We moved on technophobia as we went from computers to other forms of technology, particularly VCRs were popular back then, and people were afraid to try to fix their VCR from flushing 12 o'clock, 12 o'clock, 12 o'clock. So they've ask a 12 year old to do it for them.

We went from there to techno-stress. We went from techno-stress to lots and lots of research about what might be stressing people out. In fact, I was cleaning up my office and just realized that we had done a study of 33 different countries and had our questionnaires all translated into all their languages. Unfortunately, I had to throw them all away as I was cleaning out my office, but it was a reminder that back in the early '90s we started studying international techno-stress. I wrote a book called TechnoStress back in the '90s, and then just started studying aspects of the impact of technology that impacted my kids. So we studied video games when I had a kid who played video games. When my kids started getting into social media, I studied social media. When I started getting into online dating, I studied online dating.

And now I'm at the point in my life and my interest that I'm really looking at the bigger picture. And I call it the what, why and the how of technology. The what being, what are people doing? And we can talk about that because that's a trickier question than one might think. The why is the why are they doing it? And that's also a tricky question because there's both cognitive reasons. There's affective reasons. There's psychiatric reasons, but there's also tech company reasons. And so that one's on another interesting layer of where I am. And then the final one, which is most important to me, is the how, which is how can we help people?

**KL:** Okay. So I would love to hear more about each of these areas, especially some of the projects that you're diving into. Do you want to start with the what and elaborate on that a little bit?

**LR:** Sure. We don't really know what people are doing with their technology. We have a guess, and most of the research uses self-report measures that try to assess, you know, "How many minutes a day do you spend doing such and such? How many minutes a day do you spend doing such and such?" And we still collect self-report data, but the self-report data are tainted. For example, if you ask me. "How many minutes a day do I spend on my computer, and how many minutes a day do I spend a phone?" Well, I'm often using them at the same time. How do I parse that into, "Well, it's like two thirds, one third." And so maybe I'm spending two hours on my computer and an hour and 15 minutes or an hour on my phone. But I do a lot of switching back and forth. And how do you balance out somebody who checks their phone for three minutes 10 times an hour, how are they supposed to estimate their time? And there's some research out there that shows laptops ... Excuse me. That we are bad estimators, that we tend to overestimate the amount of time.

So one of the things that we've been doing for the last, since 2016, is having my large class of students, 400 students, put an app on their phone that monitors a lot of things, but primarily what we use is the number of times a day they unlock their phone and the number of minutes it stays unlocked. We've been using that 2016, 2017, 2018, just finished it doing it 2019 with my millennial students. And whenever I talk about my research, my millennial students, they're different. We are an older institution. In terms of our student body. A typical student is a 25 years old, not 19. A typical student works full time. A typical student has a family, so it's really truly a millennial, just happened to be going to school.

And then we also have been doing exactly the same thing with high school seniors. So back in 2016, our millennials were unlocking your phones about 50 times a day roughly, and staying on them for about 220 minutes, which we thought, "Wow, that's a lot." That's almost four hours a day that the phone is unlocked. 2017 stayed pretty constant, the number of unlocks around 50 a day, but the number of minutes went up from 220 to 260. Next, the number of minutes stayed pretty constant at 260, so that's like four and a half hours, but the number of unlocks jumped up to 70. And what we're seeing with teenagers is they're on their phones about 270 plus minutes a day, but more importantly, they're unlocking their phones about 75 times a day. That means they're unlocking it about every 12, 13 minutes that they're awake.

**KL:** Wow.

**LR:** And then spending a few minutes on it and getting off, and then doing that over and over and over again all day long. And in some of our sleep research, we also find that they're doing it all night long too.

So part of what that has done is it's given us a gross picture of how much time people are spending on their smart phones. We got very excited when Apple put out Screen Time and Google put out Digital Wellbeing because that gives us much more detail about what exactly are they doing on their phone, not just how many minutes a day, not just how many unlocks, but Screen Time gives you how many minutes you spend on each app. It tells you when you unlock your phone, what's the first app you go to. It tells you how many notifications you get and where they come from. So you get a a richer set of data from Screen Time. The problem unfortunately, not wanting to rip Apple too much here, but the problem is, is that Apple collects data on a seven day cycle. There's no way to download the data. You can take screenshots, which is what we have our students doing. So at the end of of the week, on Sunday, they take screenshots because Monday, the earlier Monday disappears, and they start the whole seven day cycle again, and it's not downloadable.

But we're getting interesting data because, for example, I spend five hours plus a day on my phone. But when you look at what apps I'm using, I'm using ESPN and MLB because I watched the Dodger games all the time. So does that mean I'm overusing my smartphone? No, it means I'm using it for entertainment. When we look at at young kids, and we have high school students who have sent these in on a voluntary basis, and we have about 200 weeks worth of data. So we're starting to look at that. And what we find is that they're primarily spending their time on communication, and primarily on social media and texting and chatting, video chat and non-video chat.

So we're hoping that Apple will start allowing people to download more data so we can really get a real good glimpse of what people are doing. But what we've found when we look at the data on just how much time they're spending and how many times they unlock, it's not the time they're spending that turns out to be predictive. It's the number of times a day they unlock their phone that turns out to predict a bad night's sleep, and it turns out to predict a poor performance in their courses. In fact, we're now looking at a set of data where we've collected all of those data, plus data on anxiety, depression, and stress. So we're going to see if unlocking their phones 75 or more times a day may predict depression as some people have suggested or may predict stress or anxiety. So we're trying to get into the nitty gritty detail of the what in order to understand the why.

**KL:** Mm-hmm. This is really fascinating, Larry.

**LR:** I find it fascinating.

**KL:** Yeah. Well, of course, you've spent so much time on it. I'm wondering if you can share any challenges that you've encountered in these studies. You talked a little bit about accessing the data and how that capacity for data is changing. Are there other challenges that have been difficult?

**LR:** Well, part of it is the technology itself. And really the challenge, I think, comes from the tech companies. Representative Holly introduced a measure today in Congress called Smart Measure, and I forget what it stands for. But its idea is to hold companies responsible for all the things that they're doing to entice people, first, to move their eyeballs to their smartphones, to their apps, to their websites, whatever. And second, to keep them there. And he highlighted several things. Three very important ones in his act, or his resolution ... I don't even know if it's an act or if it's a resolution. One is YouTube auto play, where YouTube will play a video, and then automatically ten, nine, eight, seven, six, five, four, three, two, one, play play next one, and on and on. He feels that that's keeping kids connected far too long and far too much, and adults who just kind of wander into this YouTube vortex and watch them over and over.

Another one that he's interested in attacking is what he calls the infamous scroll, where you get on something like Facebook or Instagram and you start scrolling, and you just scroll and scroll and scroll and scroll, and there's no end. It just keeps going. Unlike, say, search in Google. I mean, can you imagine if you searched Google and it was an infinite scroll? It was all on the same page. You wouldn't know where to stop. And so Google uses page one, page two, page three, so he's encouraging tech companies to do that. And he's also attacking streaks. And particularly with kids with Snapchat, they keep streaks. If you snap to somebody once a day or more and they snapped back to you once a day or more, you're on a streak. And the kids are really caught in this idea, their streaks, because they don't want to miss out on their streak. And so even if they have to go on vacation, they give their password to a friend and have them keep up the streak. It's very insidious.

And then I've been looking into, deeper into, more smartphone issues. Like, for example, how do psychologists or behavioral scientists help companies like Facebook, for example, design their logo? And they don't just design it randomly. They design it so it's very attractive. They use colors specifically picked to be attractive, even the iPhone was. Originally those little round numbers that tell you how many notifications you had were going to be blue with white numbers. Steve jobs said, "No, no, no, they need to be red because red says, 'look at me right now.'" So one of the things that I've done this past year with both my millennial college students and my teenage high school seniors is to give them some options of how to change their smartphone environment to make it maybe a little easier to ignore or a little more difficult to get sucked in.

So one of ... We just basically did this as a pilot study. We gave them a long laundry list of choices under four categories: Things they could do to enhance communication, things they could do to enhance their focus and attention, things they could do to enhance their sleep, and then things they could do to enhance their psychological wellbeing. The interesting one, I think, is communication because that's what keeps coming up as the primary use of their phones. I mean even calling it a phone is kind of funny, but we'll call it a communication device. But one of the things that we did ... One of the things we asked them to do, if they wanted to, was to turn it into gray scale. So instead of getting all those colors that entice you, everything turns gray. The students absolutely hated that. And the reason they hated that is because they said, "Well, I can't find my Instagram app. I keep forgetting where I left it. I can't find my Facebook app. I keep forgetting." And that's the whole point.

We also ... One of the options that a lot of them chose to do was to take all of their social media apps, of which they have six to eight anyway, stick them in folders, move them to the last home screen, and then embed the folders within each other so that it made it harder to find their social media apps. Rather than just opening their phone, unlocking their phone, and the first thing they do is tap Instagram or Snapchat. That's typical. They have to go scroll for it. Maybe it gives them time to think about it. Although, one clever student told me that ... He said, "Dude ... " He said, "You don't recognize it. If I leave my phone, and I'm on my last home screen when I open up my iPhone the next time, I'm still on my last home screen, so I don't have to swipe over." So that was kind of a crashing failure.

We're looking at the data right now. And just just eyeballing them as I'm entering the data, it doesn't look like any of these things were making much of a change. It looks like the lure of this phone is so strong that even if we tell them to have the phone forget all their passwords, and they have to reenter their passwords, they still spend just as much time on their phone, and they still check it as often. At least that's our, my first glance at the raw data.

**KL:** Wow. Larry, I know we are just scratching the surface, and I'm glad you brought up students because in the next segment we're going to dive into a little bit about what you're looking into regarding multitasking in the classroom. We're going to take a brief break. When we come back, we'll hear a little bit more from Larry. Back in a moment.

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# Segment 2:

**KL:** Larry, in the first segment, you gave us so many interesting things to think about regarding technology and the brain and our uses of technology. I know you've also been doing some work on multitasking in the classroom. Can you share a little bit about your recent research in this area as well?

**LR:** Sure. First, I want to share an anecdote. I teach a large class called The Psychological Impacts of Technology. It's usually 400 plus students, general ed, across all majors. So one day I invited a documentarian in to show a documentary called Disconnected. He introduced the film and then sat in the audience, and I went to sit next to him. I sat next to a student also. Through the entire hour and 10 minute documentary, the students sitting next to me was on his phone. Second anecdote, 60 Minutes brought Anderson Cooper to our lab to see what we were doing and to use it as part of a segment that he did on technology. They came and filmed the class from the back. And almost every single student had their phone out. Now, I have to tell you that I'm a pretty dynamic lecturer, and if I can't keep their attention off their phone, that says something.

Let me describe to you an experiment we about keeping or taking away phones because I think it's very telling. Nancy Cheever did this study a few years ago. What she did, she used a very large classroom and brought in, I think just shy of 200 students. They were told to either go into door number one or door number two. If they went into door number one, they were told, "Go sit down. Sit every other seat." They'll next to somebody, not allowed to talk. "Take your books, put them underneath the seat. Turn your phone off, and put it underneath your seat. The other half of the group went through door number two and they were told exactly the same thing, except they were given a claim check for their phone. She took their phone. So we did [inaudible] different [inaudible] measures. 10 minutes in, they got a measure of state anxiety. 30 minutes in, they got another measure of state anxiety. 50 minutes in, they got another measure of state anxiety.

Then we looked at, "Were there any changes of state anxiety?" And yes, if you looked at the whole group across there, there was a steady increase in anxiety. But what was most interesting [inaudible] these people [inaudible] to low smartphone users, moderate smartphone users and heavy users. The lower, light users showed much change in anxiety. The moderate users showed no change at the 10 minute mark. But at the 30 minute mark, they started to increase, and then they leveled off with kind of a moderate level of anxiety. The heavy users, 10 minutes, and they were already anxious, and they just spiraled out of control.

**KL:** Wow.

**LR:** Who are the heavy users? Those are most of our students. So what we find, and what everybody is validating all around, is that people who use their phones a lot, which turns out to be pretty much everybody, is showing a lot of the need to check the phone, no matter what kind of situation you're in, which in general is multitasking. If you're in the classroom and you're using your phone, you're multitasking. If you're in church and you're using your phone, you're multitasking. If you're in the movie theater and using your phone, you're multitasking. If you're in your car and you're stopped at a red light and using your phone, you're multitasking. Pretty much everywhere we find people multitask.

We have done studies where we've asked people, given them a long list of pairs of tasks and asked them, "If you were faced with doing these two tasks, would you do them at the same time or would you do them separately?" The older people in my generation would say they'd do them mostly separately. The younger the people are, the more likely they are to do them together. And when you get into what we call the iGeneration, people born in the '90s, they believe that they would do 87% of those tasks together at the same time. And those tasks, some of them were pretty heavy usages, like being online and reading a book for example. They would do those at exactly the same time.

So multitasking is just rampant. Some teachers in the classroom believe that you should just take their phones away. I'm adamantly opposed to that. And the reason I am opposed to that is because of the anxiety issue. If you take the phones away, it increases their anxiety. If they're anxious, they're not paying attention. So I've been advocating for something called technology breaks for years, where rather than taking phones away, you give them periodic breaks during class to look for a minute. So in general in my class, they would listen to me for about 20 minutes, and I'd yell, "Technology break," and everybody would take their phones out and check one minute. And I say, "Okay, break's over. Put your phone away." And then 20, 25 minutes later, at a good stopping point, I'd say, "Okay. Another technology break." What I found is it makes them much more attentive, and all they need is one minute to check in with any important messages, any non-important messages, any social media.

I've been told by my students that they can check all their social media accounts and send all their text messages within one minute. So the idea is you can't stop it. You can't stop the multitasking in class. It's detrimental. There's lots of research, a tremendous amount of research that shows that it impedes learning. In the real world, it impedes relationships. Driving, it impedes your driving. Walking across the street, it impedes your ability to walk safely. Multitasking is just bad for you. But if you give people the option to single task for awhile and then jump to that task that's calling them, it seems to help them normalize and do better.

**KL:** Mm-hmm. Larry, it seems like there are so many directions that you can take this research. You've given us just a few different examples. I'm curious how you choose your next research question and how you decide on things like the design of your study, once you have a sense of what you want to narrow in on?

**LR:** Boy, that's a tough question because my ... The way I work, and I've been doing research for 40 plus years. The way I work is I observe a lot, and I observe the public. I observe myself. I observe my family. I observe my friends, and I look to see what they're doing. And the part that has gotten me into this concept of helping people spend less time on their phones but have a better relationship, has come from just watching itchy fingers, that people just can't quite keep the fingers off their phones.

You see people walking with their phones in their hands more now than ever before. You see people tapping their pocket, just to make sure, to reassure themselves that their phone is still in their pocket. You see people with phantom pocket vibrations, thinking their pocket vibrated, meaning it's their phone, and it wasn't. You see people suffering from nomophobia, which is the fear of not having their phone available or not being able to connect to their phone, not having the internet. You see all of this going on, and that has spurred me to look at, "What are the contributors to this? What causes this kind of behavior?" And then more importantly ... At this point we know from the last five, six years of research how detrimental it is. We know that it affects your sense of wellbeing. It affects your stress level, your anxiety level, your depression level. It affects all of these. How do we fix that? What can we do to help people? And there are a few other people out there who are doing this, trying to look at this. The idea being that if you can offer simple suggestions to people that will make them happier and not make them feel like they're ignoring their technology, their smartphone, then you win.

**KL:** Okay. Larry, that's kind of an obvious next question. What are some of these things that you can offer based on your research that will help people to kind of deal with this technology in a way that feels more manageable?

**LR:** It depends on where your angle is. One of the things that I find really important is the research on sleep and how getting a good night's sleep affects you in so many ways that are positive, whereas getting a bad night's sleep affects you in so many ways that are negative. So one of the things that you can do is follow the National Sleep Foundation's recommendations, which is to remove your phone from the room an hour before bedtime, simple. It's a simple change. It was one of the options that we offered to our students this last year. I'm interested to see how many chose that option and what they thought of it because we had them write papers on how that impacted them. But I know I've made a pretty substantial change there, and I know it's affected my sleep positively. That's one area.

Another one is, and I think this is really important for students, is using your technology to help enhance your focus and attention. It seems like right now your technology, particularly your smart phone, is taking away from your focus and attention. So how can you possibly use that to enhance it? Well, it's got little buttons called do not disturb, for example. It's a very simple thing you can do. If you're a student and you're studying, maybe you're writing a paper, you start by putting on the do not disturb for 15 minutes. When the 15 minutes do not disturb goes off, you can give yourself one of those one minute tech breaks, and then set it again for 15 minutes. And as you do this, you realize that you don't need to check in every five to 10 minutes. Every 15 minutes is fine, and so now you manipulate it and change it to 20 minutes or 25 minutes or 30 minutes. I always tell people, if you can get your focus, if you can get your do not disturb for 30 minutes and clearly not be disturbed by your technology, that really gives you a good amount of time to think, to process, to do homework, to read, rather than reading two paragraphs and getting a text and getting interrupted.

One of the things I did with my class this semester, it was an online streaming version of the class. Nobody watched it live, of course, because they don't do that, but they watched it on YouTube. So I had them have somebody observe them watching on YouTube, one of my lectures. And part of the observation was they had to note how many times they got distracted, how many minutes they got distracted and what distracted them. And we're starting to look at those data, but it's very clear that they get distracted for about a third of the time. They don't stop the video. They keep it running. And the major distracter is some form of communication, and it's usually that they check a tweet, they check a text, they check social media, they talk to somebody, they get distracted. And so the idea is, can we help them avoid the distractions? They know that it's bad. They absolutely know that it's bad. They know that it's wrong. They just can't help themselves.

**KL:** Larry, what is next for you with this line of research? It seems like there are innumerable questions that you could be asking. Are there certain areas that are intriguing to you right now?

**LR:** Well, besides this, the strategic changes people can make, one of the areas that our lab has been interested in for awhile is looking at how technology affects the body and the brain. One of the things that Nancy Cheever has done is she's done ... She's clipped on people, particularly people like Anderson Cooper, Katie Couric. She's clipped a little gizmo on their finger that measures heart rates and galvanic skin response. The GSR is the most important one because that measures arousal, which is often anxiety. And then what she does is she has them watch a video and tells them just to put their phone next to them. And then a couple minutes in she says, "Oh, your phone's interfering with the technology. We're just going to move it back here on a table a few feet behind you." And then she starts texting them. And when she texts them, their galvanic skin response spikes.

So what we see is an autonomic reaction here of arousal. And guaranteed that arousal is anxiety because when we asked Anderson Cooper or Katie Couric, "Here's your spike in your arousal. Why do you think it was caused?" Katie said, "Well, I was worried that maybe my daughter was trying to get in touch with me." And Anderson Cooper said, "I was just anxious that I didn't have my phone in my hand." He said, "It's in my hand all day long." So we're going to do a better version of this study where we actually compare it to just random noises to make sure that it's not just the startle reaction of the phone that's making your GSR spike, but it's actually the content of what the startle reaction is.

Then we also have a device called the functional near infrared spectroscopy, fNIRS for short, that wraps around your forehead and monitors on a continuous basis processing in 16 areas of your prefrontal cortex. Prefrontal cortex is where all your executive functions are, and we've looked at comparing very light users of technology with very heavy users of technology on executive functioning tasks, particularly things like the Stroop tests or Go/NoGo task or N-back task, tasks that really tax your executive functions. And on the surface ... I mean, we haven't published this yet. But on the surface what we find is that heavy users use their prefrontal cortex differently than light users. One of the studies we want to do with that now is to see what happens if we have them do the task, take a heavy user, have them do the task, and just start inundating them with phone calls and text messages and phone calls and text messages, boom, boom, boom. What does that do to their ability to process on an executive function level? There's lots of opportunities here to take it into the realm of, what does this do to our bodies and our brains? And I think that's really the next important step.

I should point out, by the way, that I'm retired. I do this because I think it's really important to understand what these devices are doing to us and with us. It seems like a topic that's never ending. As you can imagine, every time there's a new social media site, every time there's a new anything, it affects us. It impacts us. And there's lots of colleagues on boards of several national organizations out there that are studying this. One's called Children and Screens. That's specifically looking at the impact of screens on young kids. Another's called The Psychology of Technology Institute. That looks at the impact of marketing and business and artificial intelligence on our psychology. So there's a lot of people out there who are really devoting time to trying to understand what this is all doing to us, and particularly the smart phone which is really the game changer here, but also social media and what we can do to help people. Because otherwise, I think we're going to see ourselves spiral downhill.

**KL:** Well, Larry, I want to thank you so much for taking time out of what I'm sure is a busy, even retirement, schedule to scratch the surface of this and to share a little bit about your work. This has been really fascinating.

**LR:** Thanks. It's been nice talking to you.

**KL:** Thanks also to our listeners for joining us for this week's episode of “Research in Action.” I'm Katie Linder, and we'll be back next week with a new episode.

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