100| Digital Methods of Education and Training in Neuropsychology

August 1, 2022

Speakers: Ryan Van Patten, John Bellone

🔊 **Intro Music** 00:00

Ryan Van Patten 00:17
Welcome, everyone, to Navigating Neuropsychology: A voyage into the depths of the brain and behavior, brought to you by INS. I'm Ryan Van Patten…

John Bellone 00:25
…and I'm John Bellone. In case you haven't noticed, this is episode #100 for NavNeuro. It's wild that it's been nearly four years since the podcast was launched in 2018. We'd like to give a huge thank you to INS, to our advisory board, and to all

of you, our listeners. We never imagined that we would get even a fraction of the listeners that we currently have, and that the audience would be global. You are the reason why we keep NavNeuro going, and why we plan to do so for the foreseeable future.

Ryan Van Patten 01:00

There are several specific additions to the podcast that we are especially happy about. For example, we now offer some NavNeuro episodes for APA-approved continuing education credits through INS. We also have transcripts for all episodes, and a big thanks to Cathy Longa for her help with this project. And we regularly talk to guests from outside the US. We're also happy that NavNeuro is freely available to anyone with an internet connection, and the podcast will remain free of any paid advertisements. As John mentioned, we plan to continue doing this for the foreseeable future. We have seemingly endless ideas for topics and guests. Of course, you as our listeners are always welcome to email us with ideas for future topics as well as any feedback you might have for us. Our email is feedback@navneuro.com.

John Bellone 01:53

Since this is a major milestone for NavNeuro, we wanted to do something a little different for this episode. Specifically, we want to talk about podcasts and other digital forms of education and how they might be used in formal training programs in neuropsychology. Given that you are currently listening to a digital method of education right now - this podcast - we think that this episode is likely to be very relevant to you. We recently published a paper in Archives of Clinical Neuropsychology on this topic and then presented it at the 2022 American Academy of Clinical Neuropsychology and National Association of Psychometrists meetings.

Ryan Van Patten 02:35

This is a rare type of episode where we have PowerPoint slides to accompany the audio. You can download the slides at navneuro.com/100 if you'd like to follow along with those; however, the slides are by no means essential. Also, this episode will be done in a presentation format rather than a conversation, which is unique for NavNeuro, and we hope you enjoy it.

Transition Music 02:58

John Bellone 03:08

Welcome, everyone, to our talk on Digital Methods of Delivering Education and Training in Neuropsychology. I'm John Bellone, and I'll be delivering the first half of the presentation. My colleague Dr. Ryan Van Patten will cover the second half.

John Bellone 03:23

Just for a few potential conflicts of interest: we'd like to tell everyone up front that we are the creators and hosts of the podcast Navigating Neuropsychology, which is partnered with INS. Also we receive royalties from Springer for our book "Becoming a Neuropsychologist", and the book covers digital methods of education.

John Bellone 03:41

If you're interested in additional details of anything we cover today, our paper on this topic was recently published in Archives of Clinical Neuropsychology and we would like to thank our co-authors on the paper Drs. Taylor Schmitt, Leslie Gaynor and Cady Block for their help with the project.

John Bellone 03:58

The future of neuropsychology depends to a large extent on the quality of current educational practices in the profession. In other words, if our training is high quality today, then we can expect high quality service delivery in the future once current trainees become practicing neuropsychologists. For over 20 years, training in the field has been guided by the Houston Conference Guidelines, but the guidelines were not intended to create a permanent, fixed set of rules and efforts are underway to delineate competencies and to update the guidelines themselves through the Minnesota Update Conference. Teaching and supervision are core skills of neuropsychologists, and recent progress has been made in developing the taxonomy of education and training in clinical neuropsychology and in providing guidance pertaining to clinical supervision, practicum training, and postdoctoral training. These efforts all help delineate the "what" of education and training. They focus primarily on specifying terminology and describing what should be learned at various stages of training.

John Bellone 05:09

But there's also potential for growth in the "how" of training. How do we most efficiently and effectively deliver brain-behavior knowledge and skills to trainees and help them achieve the desired competencies? Ryan and I believe that 21st century digital technologies can facilitate growth in our field in this area. The idea of infusing technology into neuropsychology is not new. There is already a lot of interest in integrating digital technology into cognitive assessment tools via computer- or smartphone-based testing. Many clinicians and researchers are already doing

some form of telehealth. Our point here is to emphasize that we believe that a parallel effort specific to education in neuropsychology could benefit the field and drastically improve equity and inclusion, which is consistent with the AACN Relevance 2050 Initiative. With that in mind, in the current presentation, we provide 1) an introduction to three digital education methods: podcasts, webinars, and social media platforms; 2) we give a discussion of general benefits and drawbacks of each of the methods; 3) we provide a literature review on self-reported satisfaction and objective learning outcomes; and 4) we will give some recommendations for how educators and neuropsychology trainees might implement these methods effectively. Keep in mind as we move through this talk that podcasts, webinars, and social media are not the only digital education technologies available. There are many others such as blogs, YouTube videos, mobile phone apps, and many more. We selected podcasts, webinars, and social media for our paper and this talk because we feel that they are particularly easy to use, they're widely available, and they're very relevant to neuropsychology.

John Bellone 07:10
Before we talk about the digital methods, we want to briefly discuss the pros and cons of traditional education, or the so-called "chalk and talk" method where there is a teacher lecturing to a classroom of students, which we're all quite familiar with.

John Bellone 07:26
There are obviously many benefits here. It is a structured setting that's relatively distraction-free. It's inherently interpersonal, with the possibility for discussion and interactivity. Of course, clinical psychology is, by its very nature, a social profession. We work with people. A social learning environment can allow for experience, exposure, modeling, and other forms of learning that apply directly to our work with individuals and groups of people. Importantly, this method is very familiar and there's a long history of effectiveness from in-person lecturing. As you know, the history goes back to at least Ancient Greece.

John Bellone 08:09
But there are downsides. We are limited in how many students can occupy the classroom, and it must be done in a single location and at a particular time. This can lead to inequality based on pre-existing factors such as wealth and geographic location. Also, the material is presented only once at a constant speed to everyone in the room. People, of course, learn at different rates. In classrooms, some learners feel bored because they already know the content, others struggle to keep up. And we've all seen just how vulnerable the setting is to a pandemic.

John Bellone 08:46

So this leads us to an opportunity. COVID-19 significantly disrupted the way that we communicate and teach. People don't expect that all learning will occur in classrooms, on chalkboards any longer. With more openness toward digital technologies for education, there is the potential to formally integrate these methods into our training programs. We believe that this can be done in a manner that truly improves learning outcomes, such as knowledge retention and skill building and that it can be done in a way that increases access to high quality education for people who are at economic and societal disadvantages and who have a lot to offer the field. This will influence the makeup of our field and the quality of services that we can provide to our patients. We want to be very clear that we are not advocating for doing away with the traditional model. It still has important advantages that cannot currently be replicated by digital methods. But we want to propose a hybrid traditional / digital model. We think that we can have our cake and eat it too, so to speak. That we can keep the benefits of traditional methods and too also address some of their limitations.

John Bellone 10:03

This is where podcasts, webinars, and social media potentially come into play. We're now all at least somewhat familiar with these types of methods given that the pandemic temporarily forced educators and supervisors to find new ways to communicate with trainees. These technologies have been growing in popularity for at least a couple decades, but the pandemic drastically accelerated that trend. Importantly for us, the increased familiarity with digital tools opens the door for implementing them into neuropsychology and we'll be focusing on these methods throughout the rest of the presentation.

John Bellone 10:41

As I mentioned earlier we'll flow through the overview, benefits and drawbacks, evidence, and implementation for each of the methods.

John Bellone 10:50

Let's start with podcasts. Podcasts are digital audio files that are released as part of a thematic series. Podcasts emerged in the early 2000s. Early on, Steve Jobs characterized this medium as "TiVo for the radio". In other words, these are pre-recorded audio files that can be listened to anytime, anywhere, with pausing, rewinding, and fast-forwarding capability. This is a game changer in terms of convenience and ease of use for many people. Apple Podcasts is by far the most popular platform, but there are many others. Listeners typically download and listen through an app on their phone, but episodes can also be listened to on various websites. Content is typically free and sometimes includes visual aids.

John Bellone 11:37

A recent study used a random digit dialing approach to survey over 1500 representative Americans aged 12 and older about their podcasts listening habits. Fifty-seven percent reported that they have listened to at least one podcast in their life, and 41% had listened to a podcast in the prior month. Because the sample generalized well to the overall US population, they use their data to estimate that about 57% of Americans currently listen to podcasts, which is roughly 162 million people.

John Bellone 12:14

Together with the growing popularity of the medium as a whole. The number of available scientific and medical podcasts have substantially increased over the past decade. Numerous healthcare specialties have at least one dedicated podcast for students and/or practitioners, and there is rapid growth in this area. As just one example, the number of active orthopedic podcast series increased from five in 2016 to 67 in 2021 - more than a 13 fold increase in a five year span. Importantly, use of podcasts is not confined to the US. There's evidence for increasing popularity in Canada, South Africa, Germany, and all over the world.

John Bellone 12:57

Podcasts offer several benefits over the traditional method. First and foremost is how easy and convenient it is to listen to content. Many people find it to be a huge benefit that learning can occur without looking at a screen and during activities that are typically incompatible with traditional education such as walking, doing chores, exercising, etc. This allows for additional educational opportunities outside of formal academic settings. So, in plain language, that means that people spend more time listening and learning than they otherwise would. Second, podcast format and organization are highly flexible. They can vary greatly in length from a few minutes to several hours so they can be tailored to different educational goals. They support self-paced learning given that listeners can pause, slow down, speed up, and replay content as often as needed to grasp concepts. This can be particularly beneficial for non-native English speakers and for particularly fast or slow learners. Podcasts allow for increased accessibility of content and experts. Students who don't live in "neuropsych hubs" so to speak or who don't have the financial means to access those networks can still be engaged, which helps to level the playing field by reducing how much luck and privilege matter in being connected to the community and to the information. As we've noted, podcasts easily cross international borders, which facilitates widespread sharing of information. I want to drive home this point with a quick example because I think it's so important. If you can imagine the pre-digital age in neuropsychology, if you wanted to hear Edith Kaplan speak, you had better be able to make it to Boston or to somewhere where

she happened to be presenting. This would be no easy task for people who lived far away and who didn't have the financial means to travel. They would likely never hear the Boston Process Approach described directly by Edith. These days, if you want to hear directly from leading experts on specific topics in our fields, like Dr. Fujii talking about the ECLECTIC framework or Dr. Karen Postal talking about delivering feedback, you can do so with podcasts and other digital methods right from your own home. Relatedly, podcasts can provide a platform for expressing diverse perspectives and democratizing discussions on health equity above and beyond what is available in someone's local community. In other words, because there are more microphones available, we can hear the perspectives of a wider range of people, not just a few people in positions of power.

John Bellone 15:47
As much as Ryan and I love podcasts, there are several important drawbacks. As we mentioned earlier, all digital education methods require a device and an internet connection. Also, people who are deaf or have significant hearing loss will obviously not benefit from audio-only media, although many podcasts do have transcripts available. Furthermore, the audio-only format can be less effective for people who prefer visual information and for learning certain topics that are highly visual spatial in nature, like neuroanatomy and neuroimaging. While podcasts can be engaging, their on-the-go accessibility puts learners at risk for lapses of attention, particularly in busy environments. Podcasts are less interactive than classroom-based learning given the content is typically not live streamed, it's pre-recorded. Some people, like Ryan and I, like to listen to podcasts to fill every little gap in our schedules, like when we're doing chores or going for a walk, but others might want to have a better work-life balance than we have and have clear boundaries between work and relaxation and they might avoid podcasts for this reason.

John Bellone 17:02
Now let's talk about the evidence for using podcasts in education and training of medical professionals. Regarding the literature review, it's important to distinguish between self-reported satisfaction and objective learning outcomes. Someone may rate a method of education highly, but that doesn't necessarily mean it actually facilitates learning and retention. We're going to cover both aspects, but the satisfaction evidence is clear. Medical trainees and physicians enjoy podcasts. On self report questionnaires, they say that podcasts are engaging, easy to use, that they facilitate scientific learning, they improve clinical practice, and they prepare medical students and residents for clinical rotations. They typically rate medical podcasts as either equal or superior to traditional classroom-based lectures and textbook readings with respect to learning course content.

John Bellone 18:03

Of course, the goal of most educational tools is knowledge and skill acquisition, and there is a growing literature on learning outcomes of podcasts. In the six audio-only studies that tested medical students and residents before and after listening to podcasts, all six reported that there was a statistically significant improvement in test scores after listening to the educational podcasts, with a mean improvement of 18% across those six studies. Fourteen additional studies used this pretest-posttest methodology but had some visual contents that accompanied the podcast, most commonly PowerPoint slides. All 14 showed significant pre-post improvements in scores. We should note that sample sizes were relatively small in most of the studies, with Ns ranging from 40 to 238 for the audio-only studies. In addition to simple pre-post score increases, many researchers are also interested in comparing learning outcomes between podcasts and traditional forms of education to see if there is an advantage in learning outcomes in one method versus the other. This literature is mixed. For example, out of four audio-only studies, two reported significantly greater pre-post exam improvement in a podcast group compared to a traditional lecture group. While two other studies found no differences in learning outcomes between podcast and traditional lecture groups. Twelve studies took podcasts that also had some visual content and compared them to learning outcomes from traditional forms of education, with eight of those 12 reporting that the podcast group significantly outperformed the traditional group on test or quiz scores. Note that we did not find any studies with physicians or medical residents that showed the podcast group to be inferior to the traditional group. There are also studies outside of the physician and medical student literature, but those findings are overall consistent with what I presented here. I won't go into those now for the sake of brevity, but you can read more about them in our paper if you're interested.

John Bellone 18:59

In addition to listener satisfaction and the effects on learning outcomes, a few studies have objectively assessed the ability of podcasts to alter behavior. For example, one study reported that pediatricians prescribed fewer proton pump inhibitors after listening to a podcast covering the clinical guidelines on that topic. Another study found podcasts improved prescription accuracy. Two studies noted that listening to podcasts about clinical rounds or differential diagnosis improved the quality of medical students' clinical notes on objective assessment by raters. Last, physicians who frequently used podcasts for continuing medical education credits were more likely to counsel patients on healthy eating behaviors.

John Bellone 21:09

There are numerous examples of podcasts in medical education. Many medical journals and associations have been producing podcasts for years. For example, The New England Journal of Medicine, the Lancet, Journal of Clinical Oncology, Journal of the American Medical Association, or JAMA - they all have their own podcasts. JAMA is maybe the most prolific with dozens of different podcasts series for different medical specialties. There are also many psychology- and neurology-specific podcasts. One neurology podcast that Ryan and I really like is the Neurology Exam Prep Podcast. We have several that are tailored to neuropsychologists such as Navigating Neuropsychology, or NavNeuro for short, Brain Beat put out by the NAN Foundation, and the Testing Psychologist. The Sports Neuropsychology Society also recently put out their podcast cleverly named Talking Heads, but it only has one episode so far so we'll keep an eye out for that one.

John Bellone 22:11

We will quickly review NavNeuro as an example of how a podcast can increase the reach of neuropsych education. As I noted earlier, Ryan and I are the creators and co-hosts of NavNeuro. We launched in 2018 and the podcast is freely available. It's discussion-based, partnered with INS, and offers over 40 APA-approved continuing education credits through INS. There are zero paid ads on NavNeuro, which Ryan and I are adamant about, and we provide transcripts, references, and resources on our website.

John Bellone 22:47

In terms of the NavNeuro data, as of July 9, 2022, episodes have been downloaded just about 500,000 times, with about a third downloaded outside the US from over 100 countries. Each episode has an average of about 4,900 downloads, with the most popular episode being downloaded over 12,000 times.

John Bellone 23:11

And we've seen a steady increase in these numbers over the past four years. Our point in providing this data is to demonstrate that there is clearly a growing interest in getting neuropsychology education through a podcast.

John Bellone 23:25

So given that 1) podcasts are easy to use, convenient, and widely available; 2) they're popular for education among healthcare professionals; and 3) there is empirical support that they improve learning outcomes and are at least on par with traditional methods, we believe that podcasts can be a valuable tool in neuropsychology education. With that in mind, we have some ideas for how best to

implement podcasts for out of class, self-paced learning in order to lay the foundation to learn higher-level concepts in class. We'll separate this into advice for educators and advice for trainees. For educators, we suggest that you strive to assign podcast episodes that include speakers with diverse backgrounds and diverse ideas and expertise. You can also include in class quizzes, discussions, and role plays based on the podcast content. Specifically, if you're teaching clinical feedback as part of an applied neuropsychology course, you might start by assigning podcast episodes on that topic. You could then devote class time to discussing important feedback topics such as how best to deliver complex or difficult news to patients, and then have students role play these interactions. In this way, the core knowledge is mostly acquired out of class instead of being taught via just passive lectures and then skill acquisition occurs via interactive hands-on, in class activities. This is very consistent with the so-called "flipped learning" approach, which has a lot of empirical support for positive learning outcomes and which Ryan is going to talk a little bit more about soon. For some examples of how trainees can use podcasts, a graduate student working with a particular clinical population for the first time might use podcasts as part of a review of the literature designed to inform their clinical practice. This can apply to rare conditions - for example, we did an episode on moyamoya a while back - but it also applies to a more common condition that a student might need to gain more familiarity with like multiple sclerosis, or TBI, cancer, or really any topic could be amenable to this format. Similarly, students could receive a portion of their regular brain-behavior didactics training from podcasts. Neuropsychologists preparing for written and oral board certification exams can use podcasts as a study tool, like I did. As with other educational content, teachers and supervisors should vet podcast content. They should check the hosts' and guests' credentials and ensure podcast quality before assigning it as part of a formal training regimen. But altogether, I feel strongly that there are compelling reasons for incorporating podcasts into education and training in neuropsychology, and there's a growing body of research to substantiate this.

John Bellone 26:41
Now I'll pass it off to Ryan to talk about webinars. Please hold your roaring applause for the moment.

Ryan Van Patten 26:48
All right. I'll talk about webinars next. A webinar is a web-based meeting designed to impart knowledge and/or skills to attendees. There are two different kinds of webinars broadly speaking. In the first kind, you have a real live webinar where attendees are interacting with the presenter in a live virtual environment. In the second kind, you have a stored presentation that can be watched on demand

anytime. As we all know, webinars have become much more popular during the COVID-19 pandemic.

Ryan Van Patten 27:22

There are a number of benefits to webinars. The first one that is very salient to me would be cost savings and convenience relative to in-person meetings or in-person seminars. Anything in-person can be burdensome in terms of cost and travel, and sometimes that makes it not feasible for some people. Whereas, for a webinar, as long as you have internet access, then you most likely are able to access the webinar. This can be important in neuropsychology education when we think about equitable training and delivering education and training to as many different people as possible. There are also benefits related to the technology used to deliver webinars. As I mentioned, webinars can be stored and viewed at your leisure. They can be viewed multiple times meaning that there can be repetition of content, which is very important for learning and retention. Relatedly, because of the technology, the number of attendees in a webinar is theoretically unlimited. There are no physical space constraints as to how many people can attend and view a webinar as compared to a classroom or a seminar at a conference.

Ryan Van Patten 28:39

There are also drawbacks to webinars. The biggest one here is the lack of in-person social interaction that is just so important and abundant in in-person meetings. Things like idea exchange, mentorship, networking, anything that involves real world spontaneous interactions with people, that's really maximized in the in-person setting - a classroom, a conference, places like that. Webinars can do a fairly good job of facilitating social interaction, but they can just never duplicate or replicate what we can get from in-person meetings. I had mentioned a few strengths of webinars in terms of the technology, but we're all aware of the fact that webinars can have tech issues as well. Freezing, lagging these things can happen especially in the live virtual webinar format. It's very important that everyone have sufficient bandwidth and internet speed so that the presentation quality is not distorted for anyone. Then there's the issue of attentional lapses due to attempts to multitask while watching webinars. Now, this can happen in any type of learning environment, even in person, but especially the ability to turn off one's camera and/or if people watch stored webinars when there's not a social component so much there can be this temptation, which is understandable, to try to multitask because many of us have a lot on our to do lists. But trying to watch the webinar and do something else can obviously distract attention away from the content and can reduce learning.

Ryan Van Patten 30:22

Now I'll move into the evidence related to webinars used for educational purposes. Similar to podcasts, the literature review here was focused more on healthcare trainees and professionals because we want to generalize to neuropsychology as well as we can. In terms of evidence, first I'll talk about self-reported satisfaction and perceived benefits - this is what people think about these educational webinars. Overall, results from a thorough literature review suggests that many people enjoy webinars for educational purposes. There's a lot of positive things that attendees have to say, especially these attendees in healthcare professions. Just as a few examples: participants have reported that webinars promote greater deep learning, that webinars facilitate increased use of evidence-based interventions. Here I'm referring to a study of over 280 nurses in the US who, after watching a webinar, were more likely to use an evidence-based smoking intervention than they were before viewing the webinar. Again, many healthcare professionals and trainees in the United States and out of the United States report high overall satisfaction. There's one study that we will link to of over 3600 healthcare professionals in Indonesia who reported high satisfaction from viewing educational webinars.

Ryan Van Patten 31:53

Satisfaction, perceived benefits, that's important because these tools need to be used by people to facilitate education. But that's not enough. We really need to show that webinars facilitate improved learning outcomes. With that in mind, fortunately, there was a good 2019 systematic review and meta analysis in the journal Educational Research Review that we will link to. This is by two researchers in Germany. In this study, they reviewed learning outcomes from webinars. Specifically, they reviewed 12 randomized controlled trials, over 1000 total participants who were primarily, again, healthcare professionals or trainees such as medical students, physicians, graduate students in clinical psychology, mental health professionals. The learning outcomes in the study were all performance based - so quizzes, exams, ratings by supervisors, and clinical vignettes, things like that. They looked at both pre-post comparisons in the webinar group and they compared webinars to control conditions, mostly traditional forms of learning. With a pre-post design, there was a very large effect size, Cohen's d of over 1.5, showing that participants who viewed a webinar learned from that webinar. Their scores on the performance-based outcomes were better after compared to before viewing the webinar. This may seem obvious, but it's very important to first show that this is the case. Just as an example here, if I were to view a webinar on the neuroanatomy of the visual spatial system, then this suggests that I would know more about that topic after than I did before. That's a good first step. Again, the effect size was large, which is important. A next logical question might be, "Well, are webinars better than other teaching methods?" This is the control group in that analysis. In this case, there was a statistically significant difference where webinars

were superior, on average, to other educational methods, but the effect size was very small. [Cohen's] d was 0.14, which in the real world out there, the author suggested that it has very little practical significance. In other words, it would be hard to tell the difference between a webinar and another method based on these data. Essentially, webinars were equivalent to traditional teaching methods with respect to the learning outcomes.

Ryan Van Patten 34:43

Although I just reviewed one systematic review and meta analysis, there are other data that show similar findings. For example, there's a 2012 systematic review that showed in five studies webinars were equal to a control condition in terms of learning outcomes, whereas in one study webinars were better than the control condition.

Ryan Van Patten 35:06

Fortunately, in neuropsychology, we have a number of good examples of webinars that we have access to that we can use for education and learning. Just to run through a few of them: there's the Association of Postdoctoral Programs in Clinical Neuropsychology, APPCN, multisite didactic initiative, the National Academy of Neuropsychology, or NAN, distance e-learning, the International Neuropsych Society, INS, has a quarterly webinar series. There's the KnowNeuropsychology group, and the Relevance 2050 webinar series by the American Academy of Clinical Neuropsychology. There are others as well, these are just a few examples.

Ryan Van Patten 35:49

With all that in mind, I want to talk for a minute about the idea of implementing webinars in neuropsychology education. Given the fact that the literature shows that people tend to, for the most part, enjoy webinars for education, that they have some practical benefits compared to in-person learning, and, importantly, that there is strong learning outcomes data showing that webinars are at least equivalent to traditional education, we feel that it's appropriate to implement webinars into formal training programs in neuropsychology. We're not advocating for webinars replacing traditional methods of education, but that they can supplement our traditional teaching methods. Importantly, this is the case even as COVID-19 is evolving from pandemic to endemic and it's becoming more feasible to have in-person learning again. In other words, these days, it's more and more possible for us to meet in person, masked or not, and to do our traditional education. But, even in that environment, we think that there's a role, a niche, for webinars to continue to play for the foreseeable future. I have a few specific recommendations for consideration in terms of how we might implement webinars in our education. These initial recommendations are directed to educators, and then I'll move to trainees. Similar

to podcasts, we think that webinars fit very well with the flipped learning model, where foundational information is presented out of class via a webinar or a podcast and can be viewed and taken in by the students on their own time. The foundational information related to whatever topic is being taught - psychopathology, psychometrics, clinical assessment - webinars can be released and given to students as homework that they can take home and view at their leisure and then take in the core part of that topic. Then, in class time, which is synchronous time, everyone's coming together, that is spent exclusively or virtually exclusively in active roles. Students can give presentations, they can engage in role plays, they can hold discussions all about the content that they first learned using the webinar. Again, this is the flipped learning model. That's one idea or recommendation. Another one is cross institutional webinars. Here, the idea is that you have two different classes - say these are graduate level courses related to neuropsychology, maybe fundamentals of neuropsychology - and these two classes at two different institutions might be next door to each other, but they could be geographically very distant. The two professors from those courses communicate with each other and agree to hold a joint class period that is taught by both faculty together. So the joint class period happens. One other aspect that we would recommend is considering, for the students in each class, pairing them with one or more students from the other class to complete some sort of activity, like a discussion, discussion questions, something where they are interacting with each other. This method, this idea has two advantages as I see it relative to a traditional class. First, every student in both classes gets exposure to a new professor because both professors are teaching that course for this one class period. Exposure to a new professor who has a unique knowledge base and skills who they otherwise might not hear from for the whole semester or their whole education. They also get exposure to a student from another class who has unique perspectives, maybe fresh perspectives, to offer. That's a networking opportunity and a way to potentially learn things that otherwise they wouldn't come across. Recommendation number three for educators is considering a hybrid model for formal didactics, such as the fellowship didactics that many programs offer in order to be consistent with Houston Conference and ABCN guidelines for board certification. In other words, now that in-person lectures and didactics are feasible again, many programs are grappling with what to do. "Should we continue to hold all of didactics via live webinar? Should we go back to completely in-person didactics as was the case for many programs before the COVID 19 pandemic?" I think that a hybrid model, something like 50/50 or 60/40, allows us the best of both worlds to some degree. The burden on travel and finding physical space to meet is reduced because half the time we're meeting virtually, but we are still meeting some of the time and so we still get that rich in our personal environment and seeing people in person which is unique and has important benefits. A few recommendations for trainees and or viewers of webinars. First, a real challenge for webinars can be this temptation to multitask and to work on your

to-do list while viewing the webinar. This is very real, and it's not something anyone should feel guilty about. But there are strategies that can help you maintain your attention and really learn and retain the information better. A big one is to take notes during the webinar about the content. This is a recommendation that's valid even if you don't plan to use the notes later. Just the act of taking them focuses your attention and can help improve learning and retention. Generally speaking, we recommend considering webinars for a broad array of purposes. Reviewing the literature for clinical cases, studying for exams, general professional development, really anything that you need to learn that is knowledge-based could be potentially learned via webinar.

Ryan Van Patten 42:21
That wraps up the quick review of webinars. Now I'll move into social media.

Ryan Van Patten 42:28
The term social media is a very broad term that is used differently by different researchers and different people. For example, there are some publications where the term social media is used as an umbrella term and includes webinars and podcasts and many other types of media. For the purposes of this talk and consistent with how many other researchers define social media, we'll think about it more narrowly - social networking sites, bookmarking sites, wikis, things like that. What I'll be talking about primarily is two examples of social media platforms that could be used for education: Facebook and Twitter. Generally speaking, referring to social media, not surprisingly as we know, the use of these platforms has increased greatly over time in the past 5, 10, 15 years. As of 2021, there's some data suggesting that about 82% of US adults use social media. This would be well over 200 million people. Importantly, for our purposes, the use of social media in academic contexts has increased over time.

Ryan Van Patten 43:39
I mentioned that I'll go through Facebook and Twitter for this talk. Briefly, Facebook is the world's largest free social networking site. It has well over 2 billion monthly active users all over the world. Facebook has a few different features that can promote education and education relevant to neuropsychology. For example, Facebook groups can be used as digital classrooms where people can post relevant text, videos, links, conduct polls, etc. It's also possible to follow Facebook pages related to neuropsychology, neuroscience, psychology, medicine in order to stay updated on what's happening in terms of the science and the professions. Twitter is a free microblogging and social networking platform. It can be used to share links to resources and to organize information through the use of hashtags. A big part of what we do in psychology and neuropsychology is to organize

conceptual information. First, we define it as best as we can and then we organize it, these constructs that we talked a lot about. This option, this feature of Twitter, having hashtags, allows information to be connected in ways that are helpful.

Ryan Van Patten 44:58

Social media, as we're defining it, has unique benefits for education and healthcare in neuropsychology. Specifically, in contrast to webinars and podcasts, which are more about directly delivering long-form education to people, social media, these platforms, what they do is they improve access to information. They are very popular, many people are already using them for personal social purposes and so there's already a familiarity with them. They can be a way to disseminate and allow access to science and healthcare information. One example of this is the so-called Twitter Journal Club. This comes from a publication from plastic surgery trainees, residents in Sub-Saharan Africa who wanted to come together and have a journal club but, due to geographic constraints, they were not able to do so until they thought of this Twitter Journal Club where they shared papers and scientific information in a way roughly similar to how we might think of traditional journal clubs. There were no learning outcome data reported from this, but in terms of satisfaction, many people enjoyed it and said that it had good benefits for their learning. Another specific benefit of Twitter that has been reported is that it can be used as a push technology for teachers and educators who want to share course-related information with their students. What this means is if somebody is teaching a course, they simply use Twitter to communicate directly to students. This could be communication about a new paper that was published that's relevant to a topic being discussed. It could be communication about changes to the syllabus, reminders about deadlines for assignments, things like that. People have reported that a successful way to use Twitter for education is as a push technology.

Ryan Van Patten 46:59

There are also drawbacks to social media, much has been written about this. The key aspect here to be aware of is that these social media platforms are profit-maximizing corporations, they make money based on people's time and attention being spent on them and associated ads. There's a lot of engineering that goes into designing platforms that are sticky, that are hard to pull away from and this has real world implications. Just as one example, there's this idea of "doom scrolling" that people have written about, which is consuming negative news over and over. Doom scrolling is associated with negative psychological effects, as you might expect. Similar to webinars and potentially podcasts, multitasking can be an issue with social media. There's some literature showing that college students who try to multitask by using social media while also trying to engage in academic work, this attempt to multitask is associated with lower overall college GPA and fewer

hours per week studying. Another important potential drawback to social media is the possibility of misinformation. Social media platforms are open marketplaces for information of all types. There's some regulation, but not nearly the level that we'll see in certainly peer-reviewed publications, academic textbooks. Even webinars and podcasts have a greater degree of oversight and regulation of the content. If you find a science-based podcast, typically, not always, but for the most part, the information is evidence-based. Whereas, in social media, it can be harder to distinguish good evidence-based information from misinformation. Certainly, for education, this can be an issue.

Ryan Van Patten 48:58
Moving into the evidence base related to social media, first I'll talk about self-reported satisfaction. The takeaway here is that there's been a lot of research on the satisfaction of social media used for education, including in healthcare trainees. Overall, a lot of evidence supports that many people enjoy using social media for education. This is not painting with a broad brush. It's not that everyone enjoys it, but many studies have reported well over 50% of the sample has enjoyed and liked using social media for education. Just briefly, in my literature review on this, I found four systematic and scoping reviews of 13 studies, 53 studies, 57 studies, and even 125 studies. Overall, the results showed high satisfaction. The participants reported things like increased opportunity for collaboration, the ability to tailor education to their own needs, the needs of the learner, ease of use of social media, a sense of community, and interconnectedness.

Ryan Van Patten 50:14
However, when we move on to learning outcomes related to Facebook and Twitter, there's really a lack of strong evidence here. I found a number of review papers that were searching for well-designed learning outcome studies with robust performance-based outcomes, a control group, or at least a pre-post design similar to what we reported for podcasts and webinars. These review papers, by and large, lament the lack of strong learning outcome data for Facebook and Twitter. The available studies that are out there are somewhat mixed. I found a few studies that did support mild improvements in learning outcomes using Facebook and Twitter, and then a handful of studies that did not support improvements in learning outcomes.

Ryan Van Patten 51:03
I've been talking more strictly about using social media for formal educational purposes in neuropsychology. For a moment, I want to step back and just think about Facebook and Twitter for communication amongst trainees, but also just amongst people within our profession, generally. Not quite so tied to learning

outcomes, just can this be useful? Generally speaking, we think it can be. For example, a few uses of these Facebook pages by our organizations include answering questions in the lay media. Things like, "Do we only use 10% of our brains?" That question can be answered on a Facebook page by a neuropsychologist. We can also provide links to recent special issues in big neuropsychology journals. Sometimes there are advertisements for opportunities for students to win scholarships or awards to travel to conferences. There are a lot of good professional development and communication sort of uses of Facebook and Twitter.

Ryan Van Patten 52:09

But now moving back into the space of incorporating Facebook and Twitter into formal education in neuropsychology, here we want to recommend a very cautious approach. This is because of both the potential downsides of social media that I mentioned earlier - things like misinformation and the potential for poor attention on the task - but then, importantly, also because there's a lack of strong learning outcome data in the literature, unlike webinars and podcasts. We wouldn't rule out the fact that these platforms could sometimes be used, but definitely think very critically before using them. A few ideas about how they might consciously be used would be using Twitter as a push technology, as I mentioned earlier, to send reminders and resources directly to trainees to students. Twitter could also potentially be used to facilitate out of class discussions related to a specific clinical and scientific content. For trainees who are using social media, we recommend, as best as you can, trying to draw a bright line between your use of social media for personal social reasons and academic work. It can be really easy to blur these lines and hard to have boundaries, but trying to multitask in this way can really make it difficult to be productive in the time you're spending on your academic work. As much as possible, make specific time for socializing and personal time, and then set aside specific time for academic work where social media are not creeping in to that time. Then, as I've alluded to, trainees can use social media to connect with colleagues and mentors to expand a professional network. This can be connecting with people both inside your professional circles, but then also outside of your typical network so you can expand your horizons.

Ryan Van Patten 54:17

That concludes the specific social media section. Now as I begin to wrap up, I wanted to talk about a few important ways in which these three digital methods of education can be integrated with aspects of neuropsychology training. For example, we can use digital methods within our current training models. Podcasts and webinars can be used in the framework of the Houston Conference Guidelines. Extending forward, one of the key objectives of the upcoming Minnesota Update

Conference is to modernize neuropsychology by incorporating new developments in technology and this is perfectly aligned with the goals of our talk today on digital methods of education. Also, to the degree that these digital methods can be successfully integrated into coursework, didactics, and clinical skill acquisition, we think that they can support the training required by our taxonomy of education and training levels of intensity - so exposure, experience, emphasis of major area of study. If a particular training program, graduate program, internship, etc, is hoping to create a model, create a program that offers an emphasis or a major area of study in neuropsychology, one piece of that could be offering webinars and podcasts on important content in our field. Another idea is simply what John and I have mentioned throughout, which is that podcasts and webinars are very consistent with the flipped learning model of education, which has a lot of support in the education science literature. Then there are a few ways in which these digital methods can be well integrated with research in psychological science on the best ways to learn new information and to retain that information. For example, the American Psychological Association has recommendations for repetitive, spaced practice in order to facilitate learning. APA is not the only group of people who support this. There's a lot of literature stating that if you want to learn new information, learn it repetitively. Study it repetitively over time. Instead of cramming, space out that practice. Also try to learn it in varied contexts, not all simply at your same desk in your same space, try to vary the setting. Something like a podcast, which can be listened to on demand virtually anywhere, anytime really facilitates repetitive spaced practice in certainly diverse settings. Because these digital methods, assuming that you have an internet connection, are so readily available and so easily accessible, it's very easy to come in contact with information, with talks, with lectures, with discussions from experts who are all over the world who you may not otherwise get the chance to learn from. The fact that so much information, so many experts are at our fingertips makes it a little bit easier for us to challenge our own biases and misconceptions, to fill in blind spots because we can learn from people who have experiences that are different from us, who are geographically distant from us, for example.

Ryan Van Patten 57:54

Now, finally, I just want to briefly review the main points of this talk. We discussed podcasts, webinars, and social media platforms as digital methods of education. There are pros and cons to each method. Our literature review showed that, overall, there's good high satisfaction from most people who use podcasts, webinars, and social media for educational purposes. Most of these participants were in healthcare education, which generalizes fairly well to neuropsychology. There are also moderate or strong data supporting learning outcomes for podcasts and webinars used for education, while learning outcome data for Facebook and Twitter, as representations of social media, these learning outcome data are

currently lacking. Of course, absence of evidence is not the same thing as evidence of absence. It could be that Facebook and Twitter do work very well for improving learning outcomes in specific formal training settings, we just need more research in that area to try to figure that out. That would be our first future direction for this talk - more, better learning outcome data for Facebook and Twitter and other social media platforms. Another future direction would be learning outcome data that's specifically in neuropsychology trainees for podcasts and webinars. For example, this could be a randomized control trial using the KnowNeuropsychology webinar content or even using NavNeuro in neuropsych trainees. This would provide the most direct and generalizable evidence that these educational methods work in our own trainees. Our overall takeaway is that digital methods have important advantages compared to traditional learning. We do not think that digital methods should replace traditional learning because there are also important benefits from being together in person with each other. We are psychologists, we understand the importance of face-to-face interpersonal interaction, but we think that digital methods can supplement traditional methods in important ways to create an even richer and improved training model in neuropsychology.

🔊 **Transition Music** 1:00:22

Ryan Van Patten 1:00:27
Well, that does it for today's episode. Once again, John and I want to express our deepest gratitude to all of our listeners. We know that there are many different things you could be doing with your time, so thank you for tuning into the podcast when you can. In case you're wondering, we will be back on the 1st of next month with a more traditional full length NavNeuro interview with an expert in a topic relevant to neuropsychology. We will also continue to bring you clinical cases and other Neuropsych Bites on the 15th of the month. So, as always, thanks so much for listening, and join us next time as we continue to navigate the brain and behavior.

🔊 **Exit Music** 1:01:05

John Bellone 1:01:29
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Ryan Van Patten 1:01:41

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