

DNP Project:

The Educational Podcast: The Future Learner's Preference for Multitasking

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### **Abstract**

The creation of an evidence-based podcast for certified registered nurse anesthetists (CRNAs) and student registered nurse anesthetists (SRNAs) brings the most in-demand educational topics and up-to-date research to the growing population of millennial practitioners. Defining the learning needs of the CRNA and SRNA through pre-implementation surveys and analyzing the download rate of the created podcast establishes a research basis for nurse anesthesia focused educational podcasting.

This cross-sectional descriptive study analyzes pre-implementation survey results which focus on current podcast listening habits, topics of interest for future podcast creation, and demographics. Recruitment was initiated through social media outlets, and the quantitative research sample was a voluntary group of CRNAs and SRNAs.

An online survey allowed respondents to participate via mobile smart devices and ensured fidelity of data quality. Of surveyed individuals (n=287), 60% were CRNAs and 40% were SRNAs ranging in age from 24 to 75 years. A majority, 75%, of participants stated they utilize existing podcasts for educational purposes specifically pertaining to anesthesia topics. Desired topics of future podcast creation showed a significant preference towards pharmacology (analgesics and opioids) and physiology (cardiac and pulmonology).

Once the experimental podcast, Grace Under Pressure, was released, a total of 75 devices tuned in to listen and 83% of those listeners chose to subscribe to the podcast. As the educational podcast movement continues to develop, this study may contribute to the promotion of podcasts as an education adjunct during and after the formal education of the CRNA.

*Keywords*— Podcast, Millennial, Education, Nurse Anesthesia

## Introduction

The upcoming generation of healthcare professionals are “millennial learners” born between the years 1982 and 1991 (Long & Edwards, 2010). Long and Edwards (2010) show this group “quickly become[s] bored with classroom lecture and require stimulating activities that are conducive to learning” (pp. 97). Instead, the millennial learner desires a form of education both during and after formal education that allows for multitasking. While traditional textbook and lecture formats of learning are reliable, innovation within this arena is required to ensure the certified (CRNA) and student nurse anesthetist (SRNA) remain engaged with current research and maintain a structured evidence-based relationship with education.

The American Association of Nurse Anesthetists (AANA) (2016) also highlights this shift in generational providers in a 2016 survey of their members. They compared a 2006 survey to the 2016 data showing an increasing number of providers under the age of 40 years from 22% in 2006 to 29% in 2016. The majority of the AANA membership population is comprised of practicing CRNAs. Only 15% of the surveyed population was ages 20 to 35 years and considered millennial. As the millennial population increases throughout the United States and also within the workforce of anesthesia, the educational tools created and utilized by these providers should reflect their learning needs and preferences.

Karakas, Manisaligil, and Sarigollu (2015) studied the millennial learner and highlight how “millennials tend to easily adapt to using different learning approaches [Howe & Strauss, 2007], engage easily in digital learning [Ivanova & Ivanova, 2009], [are] proficient in multitasking [Bennett, Maton, & Kervin, 2008], have advanced visual memory and visual processing skills [Tapscott, 2009], and utilize communication technologies effectively for interacting with others [Oblinger & Oblinger, 2005]” (pp. 238). These differences in learning

styles and propensity towards digital media consumption indicate auditory podcasting without the use of visual aids an appropriate adjunct form of education. By incorporating a learner's preferential form of education, implementation of an educational podcast stands to increase the SRNA and CRNA's consumption of educational resources and bring evidence-based research into practice more quickly than traditional methods of dissemination.

### **Background and Significance**

The development of the modern "podcast" began in the year 2000 and underwent a rapid transformation to the year 2005 which marked the beginning of significant consumption of the media platform as graphically represented in *Appendix A* by the author of DiscoverPods.com, Kevin Goldberg (2017). Ben Hammersley, a writer for The Guardian, coined the term "podcast" to describe the audio blog and online radio realm (2004). Hammersley highlights the advantages of this platform in comparison to radio in stating "downloadable radio is not subject to any programming regulations, nor is there a shortage of airtime, previously a major constraint on aspiring radio journalists" (2004). By creating a more mobile, on-demand form of auditory files, auditory journalists, musicians, and radio hosts increased their audience capabilities exponentially in the last two decades. Listeners can essentially consume any file at any time even with technology that can fit into the palm of their hands. The creation of and increasing popularity of the MP3 player, iPod, and finally the smartphone played into the movement and the normality of consuming auditory files anytime in any place.

In a 2017 consumer report conducted by Edison Research, awareness of the term "podcast" increased from 22% in 2007 within the American public to a current 60%, approximately 168 million people. Additionally, 40% of the individuals sampled stated they had "ever listened" to a podcast which amounts to an estimated 112 million people in the United

States. An estimated 24% (67 million) of the American public listens to at least one podcast on a monthly basis (Edison Research, 2017). Of the monthly listeners, 49% are employed full-time, however the occupations of these listeners are not further defined. The age breakdown of the Edison podcast survey (2017) showed that of the monthly listeners most (44%) were aged 18 to 34 years most closely followed by individuals aged 35 to 54 years (33%). Therefore, millennial participants, anyone ages 18 to 35, were the most frequent consumers of monthly podcast listening. Lastly, household income and full-time employment showed a positive correlation with higher podcast consumption, meaning higher grossing and full-time employees were the most likely to listen to podcasts regularly. Confounding factors that may predispose this group to podcast listening most notably include easy access to smart devices which make the listening experience more obtainable. The iTunes podcast application for iPhone was the original publisher of this media and provided a user-friendly venue for these individuals to browse, subscribe and listen to a multitude of channels and shows.

Currently, the iTunes podcast application for smartphones publishes 13 major categories of podcasts: Science/Medicine, Comedy, Technology, News/Politics, Business, Arts, Education, Games, Government, Music, Society/Culture, Sports, and Health (Castos, 2018). Although it is known that there are over half a million podcasts available via the iTunes podcast platform and smartphone application (Lopez, 2018), there is no published number by category or sub-category. Therefore, neither the number of listeners who are healthcare professionals nor number of consumers of healthcare topic podcasts is publicly known. Currently, iTunes' podcasts application does not release any analytical data to podcast producers and publishers outside the number of subscribers and number of downloads of each podcast episode. It is not known how many or what percentage of SRNAs or CRNAs utilize podcasts and how frequently. However,

demographic data released by Edison Research (2017) indicates 63% of monthly podcast listeners are employed full-time in comparison to unemployed, part-time or retired listeners. Additionally, 30% of monthly podcast listeners have “some graduate school or advanced degrees”. Lastly, 68% of monthly listeners have an annual household income exceeding \$100,000. The AANA (2016) survey showed CRNAs are averaging \$150,000 to \$200,000 which represent the 25<sup>th</sup> to 75<sup>th</sup> percentiles of the profession. Therefore, it may be concluded that highly educated, high grossing individuals actually make up the majority of monthly listeners which includes the CRNA and SRNA community.

The 2016 survey conducted by the AANA showed 25% of the currently practicing respondents plan to retire from the practice before the year 2022 while an additional 12% stated their retirement year was “unknown”. This not only represents the shift from older to younger practicing nurse anesthetists, but it may also represent the dominance of the millennial learner within the work environment. The nurse anesthetist demographic trends strongly reflect the type of individual most prone to listen to educational and entertainment podcasts. By conducting research on this group to establish their topic and learning preferences, the field of educational podcasting for the student and certified nurse anesthetist stands to expand grossly over the next decade.

The educational podcast serves as a valuable and adaptable form of free, open-access education for the healthcare professional as well as students within the healthcare fields. Vasilopoulos, Fahy, Chau, Bensalem-Owen, and Cibula (2015) exemplify the impact of auditory podcast learning in an experiment training Canadian anesthesia residents to interpret electroencephalography (EEG) using podcasts as an educational adjunct in the experimental group of the study. The experimental group participants showed a significant improvement in the



EEG evaluation test in comparison to the control. Additionally, all participants within the experimental and control groups expressed preference for podcasting to lecture, because it enables the listener to learn at his or her own pace. When asked “EEG podcasts are preferable to lecture” the frequency of responses were: Strongly Agree 28.1%, Agree 34.4%, Neutral 25%, Disagree 12.5% Strongly Disagree 0%. Vasilopoulos et al. (2015) concludes by stating “information and computer technology skills are important, as these technologies will be a requirement of physicians for continuous, lifelong learning to remain current with the rapid growth in medical knowledge and to provide optimal evidence-based medicine” (pp. 795). As the medical community continues to develop technological research and education venues, the nursing and specifically the nurse anesthesia community must follow suit in order to achieve the same continuity and high quality, evidence-based care models.

Matava, Rosen, Siu and Bould (2013) also show how anesthesia residents in Canada are already utilizing the podcast platform for education and leisurely enjoyment. Matava et al. (2013) obtained their sample through contact with 16 residency program directors. Ten of the programs responded, and researchers had a 38% response rate resulting in a sample of 159 participants. The sample was dispersed from PGY 1 through 5 so a varied experience level was obtained. The majority, 60%, of respondents said they utilized medical podcasts for educational purpose and when asked “why they found podcasts to be valuable” 72% chose the ability to review material “whenever I want” while 62% of respondents selected “wherever I want”. The Matava et al (2013) study further enforces that individuals learning within the medical and specifically anesthesia field already use podcasts for learning purposes and value the mobility and flexibility of the educational podcast.

The same is true within the student nurse community. Vogt, Schaffner, Ribar, and

Chavez (2010) show equal efficacy between traditional didactic lecture format and auditory podcasting. In 2007, the material for a child development course was presented in traditional lecture format then presented for following class in 2008 via podcasting through PowerPoint and voice-audio recordings. One of the major limitation for the knowledge gained measure of this study was that the classes were different yet comparable populations. No significant difference, positive or negative, was found between the two classes test scores indicating that knowledge gained was equal between the two teaching styles. However, the study's satisfaction post-test shows a 63% preference for the podcast format in the 2008 experimental group. These studies' results show how anesthesia providers, specifically CRNAs and SRNAs may not only benefit from the learning style of podcast listening but also may have preference for this mode of education.

Auditory podcasts have an established efficacy within the medical and nursing fields from students and practicing populations. Furthermore, the desire for podcast learning is definitive within the majority of these populations as a single or an additional resource. However, there are no formal research studies focused solely on the nurse anesthetist (CRNA) or student nurse anesthetist (SRNA) communities (Andrejco, Lowrance, Morgan, Padgett, & Collins, 2017). By determining the preferences on the format, length and content within the nurse anesthesia community then trialing that intervention, there is potential to increase education consumption and improve learning outcomes in the nurse anesthesia community.

As the anesthesia care team model continues to shift from anesthesiologists one-to-one with patients to CRNAs providing anesthesia alone or under supervision, the importance of CRNA focused education and research heightens (Neft, Okechukwu, Grant, & Reede, 2013). Karakas et al. (2015) describe the millennial culture as "always on" meaning the separation

between learning and leisure is obscured due to an individual's constant connection to resources and communication through technology. They go on to explain that millennials live in a "digital ecosystem" by constantly communicating one-on-one and in group settings through photos, videos, voice, and text platforms. Karakas et al. (2015) sites how previous researchers indicate this type of lifestyle does not lend itself to formal undergraduate education and recommends adaptation within the higher education setting to better appeal the upcoming generations of "digital natives" (pp. 238).

By utilizing an increasingly popular mode of education, the auditory podcast, geared towards the millennial CRNA and SRNA serves to increase the listener's self-identified knowledge and understanding of clinical based topics during and beyond the formal education process. Podcasts are also more efficiently created, disseminated, and consumed than traditional textbook or didactic learning formats. Up to date, evidence-based clinical knowledge has the ability to reach the provider and patient more quickly with implementation of this learning structure.

### **Problem Statement**

By defining the learning needs of the CRNA and SRNA through pre-implementation surveys and analyzing the rate of subscription/downloads of the implemented podcast, a research basis for CRNA/SRNA focused podcast learning was created and an implementation to fill those learning needs is attempted. The educational podcast helps to answer the question: Do certified registered nurse anesthetists (CRNAs) and student registered nurse anesthetists (SRNAs) utilize a 15 to 45-minute educational podcast containing topics selected on the basis of surveyed data results in a subscription versus one-time listen pattern of utilization?

### **Needs Assessment**

Advanced technological educational systems like online simulation, videos, and podcasts are proliferating within the medical and nursing fields, and the determination of efficacy in terms of content and format needs to transition into an evidence-based methodology (Cook, Montori, Levinson, & Garside, 2010). Cho, Cosimini, and Espinoza (2017) determined four outcomes based on currently available medical and nursing educational podcast research: reaction, learning, behavior, and results in patient care. The majority of current research, 64 of the total 84 articles reviewed by Cho et al. (2017), focused on medical populations (students, residents, fellows or attending physicians). The remaining 20 articles did not include specification of the audience which may be assumed to be other medical or nursing professionals. The Cho et al. (2017) literature review highlights a gap in studied populations, advanced practice nurses and specifically nurse anesthetists. Cho et al. (2017) also comment on the gap in research on podcast as educational tools as well as best practices in making an educational podcast.

The American Association of Nurse Anesthetists conducted a member study in 2016 establishing demographics and practice trends. A comparison of the 2016 to 2006 data shows a shift to the younger age brackets and an increase in the number of professionals below the age of 40 years within the profession. In 2006, 22% of CRNAs were under the age of 40 years while in 2016 this number increased to 29%. While the trend of anesthesia provision shifts more to the nurse anesthetist as well as a younger age group, the researched populations, thus far, have not followed the same trend. Additionally, research needs to be driven by CRNA professionals as opposed to exclusively physician driven initiatives in order to achieve this change.

Andrejco et al. (2017) comment on the same disparity in research through discussion on the obvious benefits of podcast education, the students' positive feelings towards podcasting format, and yet the complete lack of research on the CRNA/SRNA audience. Research on

podcast based education is a relatively new topic. There are many populations yet to be studied in utilization of this implementation. Medical and nursing populations are some of the first to be sampled, but more extensive research on the nurse anesthesia population conducted by CRNAs and SRNAs stands to make an impact on the group's continuing education and satisfaction with this new technology.

### **Objectives and Aims**

- Fill the gap in research on auditory podcasts within the nurse anesthesia community
- Establish the topics, content, length and format of preference
- Create and implement a series of 15 to 45 minute podcast episodes based on those results
- Assess a statistically proven rate of utilization of the podcast by CRNAs and SRNAs via downloads and subscription data
- Recommend future podcast creation and podcast research within this community to benefit CRNA and SRNA satisfaction and knowledge increases
- Promote podcasts as an adjunct form of education

### **Review of Literature**

The search for these resources was conducted utilizing the Rutgers library databases which included CINAHL, Ovid, Pubmed, Scopus, ERIC, and JSTOR. Keywords utilized in the search included “podcast”, “education”, “medical”, “nursing”, “millennial learning” and “nurse anesthesia”. Studies were limited to a publishing date within the last 10 years from scholarly, peer-reviewed sources, and English language only articles. Multiple articles utilized podcasts as an adjunct or dissemination method within the study but did not test the actual efficacy or conduct pre/post comparisons of the podcast as an intervention which led to an exclusion due to relevance of the study. Other articles were excluded when the studied population was unrelated

to this research population such as individuals under the age of 18 years. Sources that utilized “video podcasts” were also excluded due to the fact that videos are an unrelated educational source in comparison to purely audio type podcasts. A full description of the literature search is available in *Appendix B* and a summary of the results is available in the table of evidence in *Appendix C*.

### **History of Podcasts**

The Merriam-Webster dictionary (n.d.) defines podcast as “a program (as of music or talk) made available in digital format for automatic download over the Internet”. The feature and attainability of “automatic download” differentiated the podcast from traditional radio or audio sources. The podcast technology that allows users to download manually or automatically is now known as the RSS feed. The creation of this feed came from technology inventor, Dave Winer, in 2004 and the man credited with pushing podcasts into media trend, Adam Curry (Chen, 2009). Ben Hammersley shortly thereafter coins the term podcast and ignites a rapidly growing source of media still gaining steam today (2004). Hammersley comments the innovation by allowing anyone to be a speaker, producer and broadcaster with a small investment in equipment as opposed to traditional radio broadcasting that required clout and a minimum time requirement. Individuals could broadcast within their own time frames without approval by a station supervisor. The popularity and frequency of consumption of the media grew from there.

Edison research (2017) conducted a survey of 2000 randomly selected people within the United States aged 12 years and up over telephone interviews covering a wide range of digital media topics including podcasts and trended their results yearly

starting in 2006. Awareness of the term “podcasting” has increased from 22% of survey takers in 2006 to 60% in 2017. The study also showed 63% of individual who claim to listen to podcasts on a monthly basis are employed full-time as opposed to student, retired, homemaker, part-time or temporary unemployed individuals. Additionally, 77% of regular listeners download and listen immediately as opposed to subscribing to a podcast channel or downloading then listening later. Lastly, 69% of podcast consumers are utilizing a smartphone, tablet or other portable device as opposed to a computer for their downloads. Overall, the Edison (2017) research survey indicates a large majority of Americans are listening to podcasts with their smart devices many of whom work full-time. The assumption may be drawn these trends also apply to the CRNA and SRNA community, but no reliable sources on that topic have been published.

### **The Advantages of Podcasts**

The auditory podcast is an effective means to teach or reinforce learning outcomes. Advantages of podcast creation include rehearsal and review by the publisher to ensure all facts are delivered accurately which a textbook possesses but a didactic lecture lacks. Furthermore, a podcast allows incorporation of sounds, music, multiple speakers, and gaps in time for the incorporation of publishing. Merhi (2014) gives an updated more specific definition to podcast almost 10 years after Hammersley (2017) attempted to define it. Merhi (2014) states podcasting is “the process of capturing an audio event, song, speech, or mix of sounds and then posting that digital sound object to a web site or blog in a data structure called an RSS 2.0 envelope (or feed)” which is ultimately the summation of podcasting today. Merhi (2014) also summarizes the technological, individual and social aspects that motivate a learner to utilize podcasts but also states how the key to success is adoption of this learning adjunct by the students. Without buy-in,

this method of teaching will never be successful. However, once podcasts are adopted Merhi (2014) comments on the impact these educational tools could have on remote underserved areas while only access to the internet, although ideally access to a smart device, is required for adoption. Merhi (2014) also highlights how the students highly valued the way podcasts allowed for individualized learning and flexibility with learning pace. These advantages, individualization and flexibility, are repeatedly confirmed in podcast research especially in the student populations.

Prakash, Muthuraman, and Anand (2017) studied first year medical students (n=100) in a biochemistry course which showed a preference for short duration, supplementary podcasts as an adjunct to but not a replacement for traditional learning. They begin their study with a few conclusions based on existing literature: 1) traditional lecture does not suit nor is it preferred by every individual student 2) there is an emerging proficiency with technology by medical students 3) podcast can be useful to students who possess auditory, visual or mixed learning preferences. Students who utilized the podcasts performed significantly better in test taking as exemplified by higher test scores within the intervention group while all other variables remained the same for both groups of students. Therefore, students who utilize the additional educational resource of auditory podcasts gain an academic advantage in comparison to traditional learners. Prakash, Muthuraman, and Anand (2017) also restate the overwhelming trend in podcast research that podcasts allow for anytime anywhere learning which benefits the learner who desires to craft his or her own learning schedule. The Prakash, Muthuraman, and Anand (2017) study also reinforces the hypothesis that educational podcast increase knowledge gained and are, in fact, an effective means of education.

### **Student Learning Capabilities**



Although there is concern about the educational efficacy of podcast teaching, existing research from the last 10 years shows promising introductory results for the support of podcasts as primary and adjunct teaching tools. Although not all the studies show significant increases in test scores and other quantitative learning outcomes, the satisfaction scores related to podcast learning is overwhelmingly positive. As the preferences and creation of educational podcasting continues to develop within evidence-based research, the knowledge gained scores stand to improve as well.

McSwiggan and Campbell (2017) compared two classes of junior baccalaureate nursing classes, one in 2007 and one in 2008, who overall cited a preference for podcast learning specifically related to the ability to repeat and review topics individually and in privacy. The misunderstanding of a topic by one student should not hold back an entire class to continue learning as is true in traditional didactic lecture. The auditory podcast allows each student to review the topics he or she feels would most benefit the individual learning outcome as opposed to a one size fits all model. McSwiggan and Campbell (2017) found students were more confident and less shameful in the review of misunderstood complex topics, because they did not have to make it known to their classmates that they required further review. Additionally, there were no significant deficits in tests scores by one class over another indicating knowledge gained by traditional lecture as compared to podcast did not differ.

Abate (2013) compared three different models of education for a group of nursing students then measured outcomes through a multiple choice quiz and case study assessment. One group received traditional face-to-face lecture, the second group received long podcast in a single episode form and the third group received segmented podcasts like the second group but broken up into different episodes. The segmented group did significantly better than the other two

groups indicating a loss of attention and retention when a student listens in person or a recording for a prolonged period of time. However, the study also proves the efficacy of segmented short learning spurts for the student population.

### **Medical Professionals Learning Capabilities**

Beyond the classroom setting, medical professionals are also benefitting from and expressing a preference for podcast learning. Matava et al. (2013) studied a group of 151 Canadian anesthesia residents which showed a majority of these professionals are already utilizing podcasts for education. The study showed a preference for physiology/pharmacology topics in the form of case studies or journal article reviews within a 5 to 15-minute duration format. Although the Matava et al. (2013) sample is too narrow to generalize to all anesthesia providers, especially one coming from a nursing not medical background of education, it represents the potential success and acceptance of podcasts within the CRNA community. Both students and medical professionals have a preference for podcasts as a form of education. Vasilopoulos et al. (2015) and Vogt et al. (2010) showed significant preference for podcast learning in both medical and nursing populations. Professionals in practice as well as new learners preparing to enter practice have unanimously made it clear that flexible, individualized paths of study are the most preferred format of learning.

### **Podcasts and Certified Registered Nurse Anesthetists**

At the start of this project in January 2018, there was only one podcast created and hosted by a certified registered nurse anesthetists and a multitude of anesthesiologist hosted educational anesthesia podcasts. The CRNA hosted podcast is known as “From the Head of the Bed” and hosted by a CRNA from Maine, Jon Lowrance. He is also the co-author of the article “Social media in nurse anesthesia: A model of a reproducible educational podcast” which was published

in the American Association of Nurse Anesthetists monthly journal in 2017 (Andrejco et al.). Since the podcast premiere in January of 2015, Lowrance has published 38 episodes ranging in length from 20 minutes to over an hour and covered topics including pharmacology review, social aspects of being a CRNA and practicing abroad (From the Head of the Bed, 2018). However, as podcasting gains popularity, CRNA hosted podcasts are also becoming more and more common.

### **Recommendations for Successful Podcast Creation**

One of the biggest barriers to creating an effective medical or nursing education podcast today is a lack of recommendations from evidence-based research on how to create a successful podcast. Many variables need to be considered such as length of time and number of episodes, number of hosts, format of presentation, and topic. There are also a multitude of immeasurable variables like quality the speaker's voice, speed of talking, depth of knowledge, and level of learning. Cho, Cosimini, and Espinoza (2017) attempt to begin to summarize these variables in terms of medical podcasts in the literature review covering 84 different podcast research studies. Cho et al. (2017) summarize their results within four categories: reaction (satisfaction and preference), learning (attitudes, skills and knowledge), behavior (impact on clinical practice) and results (impact on patient outcomes). Different studies utilize different outcomes in an attempt to answer an individualized question, but a shift to a more universal assessment tool should be attempted in order to more uniformly compare research studies.

Long and Edwards (2010) list a few recommendations like a 30 second introduction, ensuring a well-defined middle and end, slower than normal speech, repetition of unfamiliar topics, having at least two speakers, musical interludes, and less than 15 minutes total in length. Not all complex topics can be covered in this short amount of time, but breaking up long

discussions into 10-15 minute stents may keep the listener more engaged and better able to recall the information later.

Existing research has shown educational podcasts to be an effective means of learning through research in the undergraduate and graduate student populations as well as the practicing medical professional. All of these groups have provided feedback indicating a level of interest and satisfaction with existing podcast education modules. However, there is an obvious gap in research within the advanced practice nursing populations and specifically the student and post-graduate nurse anesthesia populations. By researching this group's preferences within podcast learning and trialing podcasts geared towards those preferences, more evidence-based podcasts will be published to increase the nurse anesthetist's knowledge of clinical based topics.

### **Theoretical Framework**

The Knowledge to Action (KTA) framework is utilized to execute the initial intervention, assess its barriers, then tailor and reassess the educational podcast's sustainability (Dudley-Brown & White, 2012). The center triangle within the framework visually represents the funnel of information which must be synthesized before the specific problem is identified. In this case, the problem is the lack of research within the student and certified nurse anesthesia community on the efficacy and satisfaction related to the use of the educational podcast. Once identified, that problem is translated into the problem statement which serves a template for the intervention and outcome measures. These measures are more clearly identified and elaborated on as the framework works around the larger circle. This outer circle of assessment and reassessment symbolizes the pre and post-intervention phases of the project. Barriers and adaptation to those barriers cause a transformation within the intervention to finally achieve the outcome measures. This continuous assessment and tailoring circle must continue as learning needs of the

community adapt within the nurse anesthesia community. See *Appendix D* for a visual representation of the Knowledge to Action Framework specific to the educational podcast doctoral project.

## **Methodology**

### **Design**

This cross-sectional descriptive study targets CRNAs and SRNAs based in the United States as its population. The study is defined as cross-sectional, because of its incorporation and use of a survey tool. Within the Educational Podcast Study, a pre-implementation survey was utilized to define the CRNA's and SRNA's demographics, current podcast usage and desired topics for future podcast creation. Additionally, this usage of the survey also qualifies the study as descriptive since it attempts to define characteristics of the population as opposed to analytic. Although some statistical analysis is utilized to examine results, frequency and percentage are the most reflective of the study's results, thereby qualifying it as descriptive and cross-sectional.

### **Setting**

The pre-implementation survey, intervention, and evaluation all take place in an online format as the setting but within a defined timeline. Within online settings, this study occurred through multiple online sites. The pre-implementation survey was conducted through the website, Qualtrics. Qualtrics is a survey and statistical analysis tool offered through the Rutgers libraries website. It allows the user to craft his or her own survey and disseminate through text, online posts or barcode scanning. The intervention within the study was the released podcast episodes which are hosted through an RSS feed. RSS stands for rich site summary or really simple syndication created by Dave Winer and Adam Curry in the year 2000 which offers users a standardized text format to publish audio files to the internet (Chen, 2004). The educational

podcast's RSS feed is hosted through the online website service, SquareSpace. The websites created for this purpose is titled [www.GraceUnderPressurePodcast.com](http://www.GraceUnderPressurePodcast.com). Once the episodes were published on the feed, iTunes Podcast application populates them to users who can search, download and livestream the episodes at any time. Lastly, the evaluation was the collection of data points from the survey and the download data from iTunes, so no physical setting was required.

### **Population**

Social media outlets like the CRNAs and SRNAs Facebook groups, New Jersey Association of Nurse Anesthetists' (NJANA) Instagram, NJANA Facebook page, and NJANA Twitter accounts geared towards CRNAs and SRNAs were utilized to advertise the survey and podcast in order to attract participants. Although anyone within the population is welcome to take part in the study, a more technologically savvy sample may have been inclined to be members of Facebook and involved in online social media groups. Therefore, the results of the survey and study may more heavily reflect that group's preferences.

### **Intervention**

Two phases of the study occurred over a four-month period: the survey phase (October 3, 2018-November 1, 2018) and intervention phase (January 21, 2019-February 3, 2019). The gap between the two phases served as a period to analyze initial survey results and then create and publish the podcast intervention. A pre-implementation survey is available in *Appendix E* to determine correlations between subjects' demographic data, CRNA/SRNA title, current podcast listening habits and topics of interest for future podcast creation. The advertisement flyer, which is available in *Appendix F*, was posted in the CRNA/SRNA Facebook groups, NJANA's Instagram, and NJANA's Twitter to encourage CRNAs and SRNAs to participate in the podcast

survey. This survey and podcast advertisement flyer was posted in a Facebook group called “CRNAs and SRNAs”. The group requires proof of status of the members through validation of American Association of Nurse Anesthetists membership card. The group currently has 23,000 members, and this project had a goal of obtaining at least 100 responses to the initial survey. Ultimately, 289 responses were collected from participants during the data collection phase in October of 2018. Permission from the pages’ administrators stating recruitment for this project can be conducted in their domains can be found in *Appendix G*. There were no official benchmarks for the number of participants expected to take part and complete an online survey advertised in this way.

The actual survey was created and disseminated through the application, Qualtrics. Qualtrics is a free survey creation tool that collects results anonymously and under username/password protection. Qualtrics has the option to limit responses to one response per electronic device to prevent one user from submitting multiple responses and skewing results. Through advertisement on Facebook, Instagram, and Twitter with the flyer in *Appendix F*, participants were invited to participate in the 5-10-minute survey in order to better shape future podcast creation to fit their learning needs and the needs of future providers.

The first downloadable episode was created was a trailer. Its purpose was to attract subscribers before actual educational episodes were released. The trailer was released on October 1<sup>st</sup>, 2018 along with the survey so that once participants completed the survey they would be able to find the podcast channel and subscribe. Subscription to a podcast ensures the smart device will download new episodes as they are released instead of requiring the user to search for new episodes manually. The second, third and fourth episodes which were full length and covered clinical topics such as opioids, local anesthetics, and airway were released on January 21, 2018.

Each episode ranged in length from 12 to 17 minutes but were released on the same date at the same time.

### **Outcome Measures**

The pre-implementation survey provides for three demographic outcome measure: title, gender and age. Podcast listening habits are quantified in the following seven questions. The last select all that apply question of the pre-implementation survey serves as the final outcome measure. These measure serve as a basis for the podcast creation but can also indicate which age groups, specifically millennial versus non-millennial, are more or less predisposed to utilizing podcasts. The CRNA versus SRNA divide is also interesting in terms of existing podcast habits as it pertains to the educational process.

The number of times each podcast episode is downloaded and number of times the podcast channel, Grace Under Pressure, is subscribed to serves as the outcome measures for the actual podcast consumption. Number of download trends and number of subscribers is not publicized information at this time. Only the owner of the podcast can access that information. Therefore, no “score” of popularity is easily comparable. Instead, a comparison of the number of participants in the study who verbalize a desire for this type of educational adjunct will be compared with the number of time the episodes are downloaded or the podcast channel is subscribed to. Data collection is recorded in the data collection sheet found in *Appendix H*. Each episode is compared to one another to examine if one topic of interest is more popularly consumed over another.

### **Risk**

The survey and intervention are low risk to participants. No ethical conflicts apply since participation is completely voluntary and no repercussions will be experienced by viewers who



choose not to participate. Furthermore, no personal identification data is collected by Qualtrics or the Podcast software. Only the responses to the multiple choice questions are saved and accessible by the principle investigator who alone has the username and password required to access Qualtrics and podcast ownership data. Participants are able to opt of the survey at any time throughout the survey process. If a participant opts out mid-survey, their responses are not saved to the database.

### **Subject Recruitment**

Subject recruitment will take place through the advertisement flyer in *Appendix F* on the CRNA/SRNA Facebook group, NJANA Twitter, and NJANA Instagram. The flyer indicates a clear study design, purpose, risks, benefits, contact for the principle investigator, eligibility and time requirement of the participants. No financial incentives or compensation will be offered. In order to access the survey, subjects will be informed of their participation in the study and a formal consent process will follow before initiation of the survey was allowed.

### **Consent Procedure**

In order to answer the survey questions, the user will underwent a formal consent process on the first page of the Qualtrics survey. The consent form can be viewed in *Appendix I*. Consent was required by every survey participant in order to complete the survey.

### **Cost and Compensation**

Supplies required, as outlined by Andrejco et. al (2017), to record and edit auditory podcasts include a BlueYeti microphone, GarageBand recording and editing software, and a personal laptop. In order to obtain the remaining materials, \$100 to \$250 will be invested in these resources. These costs will be voluntarily incurred by the principle investigator. No compensation will be awarded to the participants or listeners of the podcast.

**Project Timeline and Economic Considerations**

Proposal completion and IRB submission occurred by Monday August 13, 2018. Multiple edits were required by the IRB over the remainder of the month of August. Once complete approval was accomplished, the survey and advertisement flyer was made public on Facebook, Instagram, and Twitter on October 1<sup>st</sup>, 2018. Collection of survey results occurred digitally over the following four weeks, ending on November 1, 2018. Between November 1, 2018 and January 25, 2018, the survey results were trended and three mini podcast episodes were recorded then publicized on January 21, 2018. Once the podcast was published, it was open and accessible to anyone using the iTunes podcast application. On February 1, 2019, the number of downloads and subscribers was recorded and compared to the number of survey participants.

Completion of the summary of results and finding occurred between February 1, 2019 and February 3, 2019. Finalization of the written project occurred over this same period of time. Defense and presentation of the entirety of the project will occur in February 4, 2019. Finally, the online publishing of the project will occur in March of 2019.

**Resources**

Resources required to record and publish the podcast, as mentioned in the cost section, include a BlueYeti microphone, GarageBand software, and a personal laptop. The price of these resources were voluntarily taken on by the principle investigator of the project. Additionally, free resources included Qualtrics survey tool technology, Squarespace website design, and the iTunes podcast application for iPhones and smart devices.

**Evaluation Plan****Data Maintenance/Security**

Participants in the pre-implementation portion of the study did not submit identification data other than age, sex, title, and podcast listening preferences. Neither IP addresses nor contact information will be requested. Therefore, all identities are not only secure but never stored within the database. Qualtrics is a specialized data collecting service. Each account is secured by a username and password which will only be known to the owner of the account, the principle investigator. Those data points will remain only within the Qualtrics website and only trends and statistical outputs will be removed for publication and presentation.

### **Data Analysis**

Data analysis occurred using SPSS and Microsoft excel software within the Qualtrics site. Trends were established and published to compare collected demographic data to podcast preference and usage data. Since the educational podcast study primarily looks at descriptive data points, analysis is most effective through frequency and percentage analysis. The study sample was analyzed as a whole then broken down into four groups: millennial and non-millennial SRNAs, and millennial and non-millennial CRNAs. iTunes podcast software does not release the demographic data of its users, so only the number of downloads by episode and number of subscribers to the podcast as a whole is made public after the implementation of the podcast. Number of download was statistically compared between each episode to establish if one topic, length of episode, or other variable attracts more listeners than another.

### **Findings and Results**

Over the two weeks the pre-implementation survey was open, 289 responses were collected. Of those respondents, 177 (61%) identified as CRNAs and 112 (39%) identified as SRNAs. Of the CRNA group, 60 (34% of CRNAs) are considered millennials by being under the age of 35 years. While within the SRNA group, 99 (88% of SRNAs) are considered millennial.

A graphical summary of the responses can be found in *Appendix J*. Title, CRNA versus SRNA, and age, under and over the age of 35 years, are the most important delineations within the data to determine how audiences may be more attracted to podcasting attributes like length of episode, topics and listening frequencies. Results were divided into four groups: millennial and non-millennial CRNAs and millennial and non-millennial SRNAs. These results in percentage format can be found in *Appendix K* while frequency of responses are pictured in *Appendix L*. Millennials were defined as anyone between 18 and 35 years of age.

Individuals who chose “no” to the question “Do you know what a podcast is?” were excused from the rest of the survey due to an inability to share preferences on podcasting. This amounted to 3 CRNAs and 1 SRNA. Additionally, individuals who had never listened to a podcast were excluded from podcast preference questions which excluded an additional 27 participants from the remainder of the survey. The remaining participants amounted to 153 CRNAs and 104 SRNAs. When asked “Have you ever listened to a podcast?” 88% of CRNAs and 95% of SRNAs responded yes. In comparison to millennial versus non-millennial, 94% of the millennial group had ever listened while 84% of non-millennials. Therefore, millennial status was a stronger indicator of “ever listening” as opposed to title.

Preferred length of episode was broken down into six categories, less than 5 minutes, 5-15 minutes, 15-30 minutes, 30-45 minutes, 45-60 minutes and longer than 1 hour. Both groups, CRNAs and SRNAs as well as under and over 35 years of age, preferred 15-30 minute episodes with 30-45 minutes as the second most popular category. The least popular category was 5 minutes or less in the SRNA group and longer than an hour in the CRNA group.

Questions 8 and 9 within the survey looked at if participants had listened to a podcast within the last year and the last 30 days. 92% of CRNAs and 97% of SRNAs had listened in the

last year while 66% of CRNAs and 70% of SRNAs had listened to a podcast in the last 30 days. Questions 10 and 11 analyzed if participants utilized podcasts for educational purposes then asked if they had previously listened to podcasts pertaining to anesthesia topics. 66% of CRNAs and 89% of SRNAs already utilize podcasts for educational purposes. 50% of CRNAs and 86% of SRNAs listen to podcasts that discuss anesthesia.

The last question within the survey asked participants to select all topics they would be interested in hearing in a podcast format. Topics on pharmacology was the most popular within all four groups (millennial SRNAs/CRNAs, non-millennial SRNAs/CRNAs). Case study presentations was the second most popular for CRNAs while cardiac and pulmonary physiology were second and third most popular topics within the SRNA group. The least popular topic within the CRNA group was interviews with SRNAs about clinical success and the least popular topic within the SRNA group was how to manage drug shortages, specifically local anesthetics in regional kits. Overall, almost all the participants know what a “podcast” is and majority have listened to at least one. However, being a millennial and an SRNA had the highest rate of podcast consumption. This should be considered when analyzing the podcast download and subscription rates, because it may be assumed most listeners belong to the subgroup, millennial and SRNA.

Once the three podcast episodes were released, download and subscription rates increased dramatically. Data was collected over two weeks following release and a graph summarizing days and rates of downloads can be visualized in *Appendix M*. Episode 2, which covered the topic of Opioids, was downloaded most frequently at 37 times, followed by episode 4, which covered airway anatomy and difficult airway management at 15 times and finally episode 3, which covered local anesthetics at 13 times. One variable that may have made the opioids

episode the most popular was having it listed as the second episode. Most users will listen to podcast episode chronologically, which indicates earlier episodes will always receive more downloads. In terms of length, the opioids episode is the shortest at 12 minutes, followed by local anesthetics at 15 minutes and 30 seconds, and finally airway which was 17 minutes. From the data collected, it seems length did not determine popularity however all three episodes were very similar which may have led to that lack of variability.

The potential impact of this experiment on the anesthesia and healthcare community in general is the presentation of more evidence-based research to more widespread audiences via podcasting. For instance, podcasting a conference to millions of podcast users allows for more widespread consumption of knowledge as opposed to requiring participants to travel and attend conferences on medical topics in the local setting. This presents a time and economic advantage over other learning models. Economically, the auditory podcast is more affordable for a user than other resources that cost more for creation and consumption. By opening and expanding an economical venue for CRNA and SRNA education, the educational podcast stands to impact the nurse anesthesia community significantly.

### **Discussion**

Through the pre-implementation survey portion of the project, an adequate sample size and reliable results were obtained. Podcast preferences based on demographics as well as topics, length and frequency of podcast utilization were assessed. The survey results provide for a good baseline preference of the CRNA and SRNA communities as well as the millennial and non-millennial groups. These results achieve the objective originally set out in the proposal portion of the project. Additionally, episodes and the podcast channel advertised to the groups who took

part in the survey provide evidence to the fact that the nurse anesthesia community is willing and able to utilize podcasting as an educational adjunct.

### **Economics and Cost Benefits**

Benefits of podcast utilization including increasing knowledge gained, delivering knowledge to underserved areas, and increasing learning satisfaction as the population of individuals within the nurse anesthesia community continues to change in terms of generational preferences, technological based education and clinical practice. The same way simulated mannequin learning has evolved to protect patients from novice providers, podcasting allows novice and experienced providers to learn more about existing research, frequent practice within anesthesia and professional development. However, the major difference between podcasts and mannequin simulation is cost. Podcasts are typically free to download and listen to without limitations on number of podcasts or hours spent listening. More practitioners stand to share their experiences and knowledge through this new model of teaching and learning within a low cost and low risk setting. Healthcare settings stand to gain economically as well from healthcare providers being better educated without the need to travel and attend formal conferences which often come at the hospital's expense. Lastly, less errors may occur within the healthcare setting when providers are more familiar and have a more recent review of their specialties.

### **Policy Implications**

The political implications related to the educational podcast include largely issues of liability. Podcasting allows the speaker to broadcast information freely without editing, and listeners should be weary of the speaker's resources. Many educational podcasts cite their references on their websites, but future policies related to this topic may include or exclude the podcaster from liability for a patient's outcome. If, for example, practice recommendations from

a podcast lead to the harm or death of a patient, the practitioner is primarily help responsible for vetting the educational source.

It must be cited, however, that although attainability of broadcasting a podcast is a benefit, it can also be detrimental to listeners. If anyone anywhere can record and release an educational podcast, the reliability of the speaker and their basis of knowledge is not authenticated the same way as traditional conference or lecture formats. Therefore, it is recommended that producers of educational podcasts clearly state in text or verbal form what types of resources they are referencing in terms of research studies or educational texts. For example, the Grace Under Pressure podcast within this study utilizes the website hosting the RSS feed of the podcast to publish a reference list which is public and accessible by anyone with wifi access.

### **Barriers and Facilitators**

Barriers that prevented ease of use and creation included financial responsible to supply the microphone and editing services required for podcast creation. Additionally, editing responsibility was endured solely by the creator and the only free education resource was online podcast creation videos. A podcast consulting or editing service would have cut down on the amount hours spent learning and editing the episodes before release. However, there were facilitators for the podcast creation such as podcasts and free video webinars dedicated to podcast creation and provided helpful tips in successful creation.

The biggest unintended consequence of these barriers and facilitators was time constraint. Hours were dedicated to learning the podcast creation and publishing process which were not anticipated and therefore delayed release of the podcasts. Advertisements for the podcasts would have increased consumption and widened the audience reception as well, but most of those



resources do not come without a price. Process evaluation took place through self-assessment of the intended timeline which was almost double the intended deadline. Therefore, future podcast creation, especially if it is the producer's first attempt, should allow for ample time to understand and learn the process of podcasting.

### **Recommendations and Implications**

Additional advances within future research on the podcast model for healthcare education is required to further develop and better establish demographic and professional data predisposing an individual to podcast usage. By understanding what factors predispose an individual to use podcasting as an educational resource, a more defined audience for the media platform would be established. Furthermore, research on methods and delivery of information would be beneficial to determine what length and content is more effectively delivered through the podcast platform. As the education podcast movement continues to develop, this study may contribute to the promotion of podcasts as an education adjunct during and after the formal education of the CRNA.

### **Dissemination**

The dissemination of this research will occur through online and in-person venues. The research will be published on the website created to host the podcast's RSS feed, [www.GraceUnderPressurePodcast.com](http://www.GraceUnderPressurePodcast.com) and also discussed at the Rutgers' Nurse Anesthesia program meeting on February 25, 2018. The research project is referenced in the introduction to every podcast episode and also featured as a part of the trailer episode, so anyone who listens to the podcast at any time will be made aware that the research exists and provided direction as to where they can find out more about the project and its results.

### **Professional Reporting**

Professional reporting of the project, its results and the implemented podcast has and will continue to take place through a variety of settings: digital publishing, physical poster presentations, and verbal PowerPoint presentation. By offering the research in a multitude of forms, a larger audience and better understanding of the research is expected to take place. The research proposal portion of the project was presented on Saturday October 13, 2018 at the New Jersey Association of Nurse Anesthetists fall meeting. The presentation consisted of a 10-15 minute PowerPoint presentation which discussed the background, literature review, implementation and gave participants instruction on how to participate in the pre-implementation survey and subscribe to the podcast.

In February 2019, the project's poster, which can be found in *Appendix N*, will be presented in poster format at the Assembly of Clinical and Didactic Educators meeting hosted by the American Association of Nurse Anesthetists in Houston, Texas. This meeting attracts a nationwide audience and individuals who stop by the poster have an opportunity to discuss the research in detail with the principle investigator. There is also information about the podcast and the website on the website for attendees of the conference to reference. The poster will also be presented a second time at the NJANA spring meeting in April 2019 with the same opportunity for attendees to speak with the principle investigator and gain more information about the podcast and the research that built it. Lastly, a manuscript form of the project will be submitted to multiple anesthesia and nursing educational journals to support the use of the educational podcast both clinically and educationally.

### **Impact on Healthcare Quality and Safety**

By analyzing the preferences on podcast production through this survey, podcast producers aiming to target the anesthesia community and specifically the nurse anesthesia

community, is able to increase popularity and efficacy of their podcasts. For example, a podcast 15 minutes to 45 minutes in length is more likely to be downloaded by this group over longer or shorter episodes. Therefore, it is recommended to stay within this time frame. A large majority of the CRNA and SRNA community are already utilizing podcasts for educational purposes, but the SRNA community, in particular, is looking for anesthesia education through podcasting. This comes as no surprise once the age demographics within the SRNA community are shown largely to be millennial and more prone to multitask while learning.

Topics of interest differ between the two groups in interesting ways. Preferred topics by the CRNA group are more practice based shown through their preference for case studies over the SRNA preferences for physiology reviews. The group looking to take classroom exams and the certification exam in the near future are more interested to review textbook based topics that require repetition. The case study review applies more the practicing group that may be assumed to be more established with their textbook knowledge. Therefore, in future podcast creation choosing to target one group over the other may be important when selecting the topics to feature.

### **Sustainability and Plans for Future Scholarship**

Further comparisons of podcast versus traditional teaching methods would also be beneficial as millennials and future generations of anesthesia providers continue to learn and consume knowledge through different modes of education. Dissemination of the survey results and continued surveys of CRNAs and SRNAs benefits the overall promotion of podcasting within the anesthesia community. While there are accessible free resources to podcasting creation and production, the learning curve is steep and requires a large amount of time to create and disseminate podcast efficiently. Ideally, a platform for new hosts and shows that provides

editing and equipment resources would be the next step towards promoting podcasts within the community.

### **Translation**

The logic model created by Andrejco et al. (2017) serves as a helpful guide to future podcasts creators and walks the creators through specific steps: goals, inputs, activities, outputs and outcomes. Additionally, the authors make helpful recommendations pertaining to equipment, investment, and advertising to create, publish and specifically sustain an anesthesia podcast. One of these tips is the creation of dialogue between practitioners. By publicizing more diverse voices within the nurse anesthesia community, transitions in practice and corporation are more likely to successfully take place. Andrejco et al. (2017) experimented with a consultation service for the creation of their own podcast, *From the Head of the Bed*. For novice creators and producers, a consultation with successful experienced podcast creators may be useful.

As social media and technological advancements continue to push our society into an “always on” culture driven and fueled by millennials, educational resources are going to diversify. By taking advantage of the benefits and being aware of the barriers and limitations outlined by educational podcast research, the nurse anesthesia community may be better able to gain and retain knowledge from more diverse sources creating a safer more individualized care setting for our patients.

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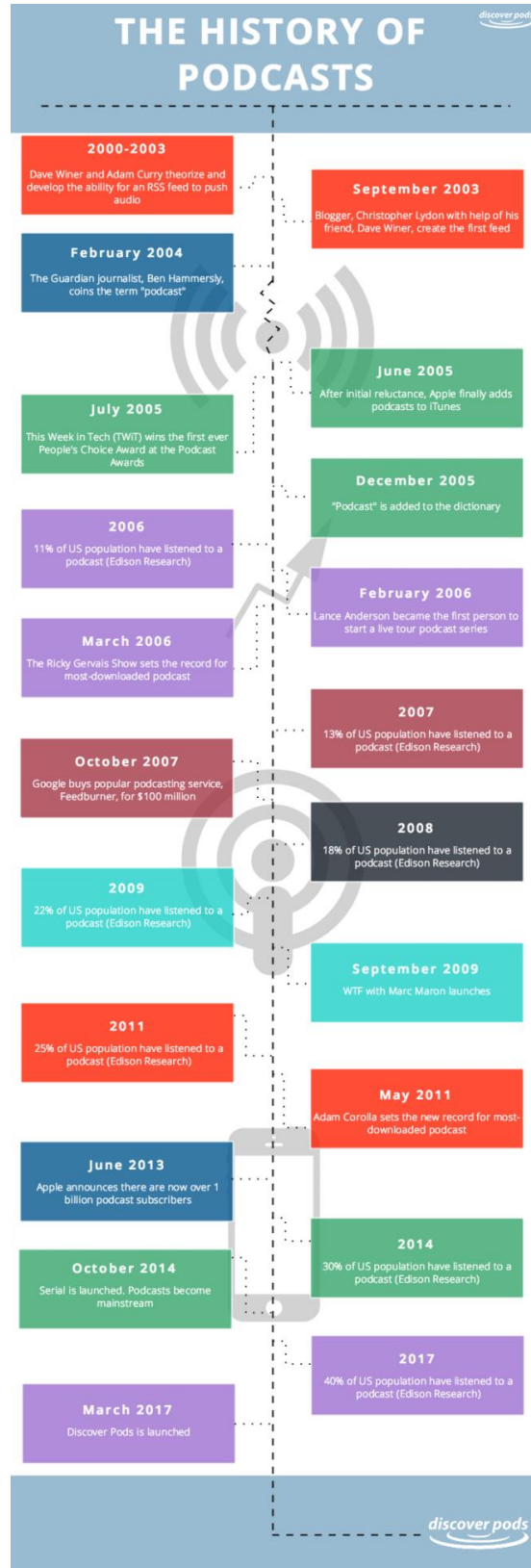
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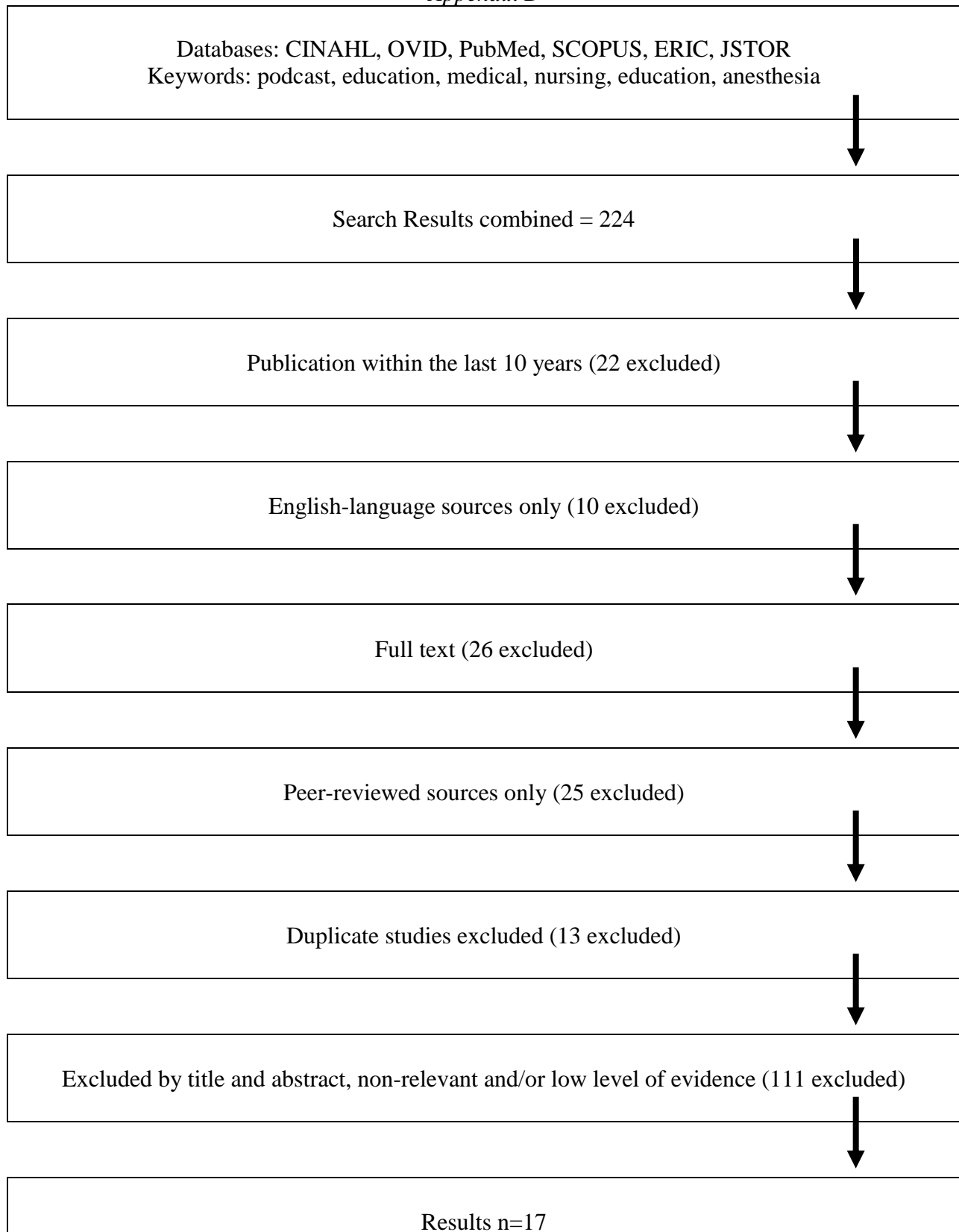
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## Appendix A





*Appendix B*

*Appendix C*

Table of Evidence

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Study findings that help answer the EBP question	Limitations	Evidence level and quality
1	Andrejco, K., Lowrance, J., Morgan, B., Padgett, C., & Collins, S. (2017).	Expert Opinion	N/A	No research within the Nurse Anesthetist population for podcast preference, format, content or length; Utilization of the Keller ACRS educational model is transferable to the podcast production; Identifies short and long term goals and outcomes for podcast research within the CRNA and SRNA community	No actual surveys of the nurse anesthesia community were conducted/published; Content of the proposed podcast was based on the authors personal experience and preference for content	Level V: Good Quality -Lacks definitive conclusions -Lacks outcome research -Credible lit review and reference to established podcast research and educational modeling
2	Cho, D., Cosimini, M., & Espinoza, J. (2017)	Lit review	Educational podcast studies; n=84	Goal is to establish evidence-based medical educational podcast modeling; Generates 4 categories of outcomes: reaction, learning, behavior, and results in patient care; Highlights the lack of research on best practice guidelines for medical education podcasting	Limited to the medical education realm; Noted when audiences were limited to resident/med student/attending but no nursing or APRNs audiences were noted	Level IV: High Quality Methods were standardized Searches and articles selection extensively described

3	Long, S. R., & Edwards, P. B. (2010).	Expert Opinion	N/A	Includes delivery recommendations (speak slowly, repeat unfamiliar terminology, content longer than 15 min loses listeners); References the “multitasking” learner as a potential target audience; Lays out clear pros and cons of podcast learning	Focused on undergraduate nursing students and practicing nurses as population	Level V: Good Quality -Credible expertise from authors -Definitive conclusions based on published reliable research articles
4	Matava, C. T., Rosen, D., Siu, E., & Bould, D. M. (2013).	Non-experimental study	10 Canadian anesthesia residency programs allowed the survey to be sent; 169/659 responded; n=169	Reflective of newer anesthesia practitioners preferred content and length/format of podcast; Physiology and pharmacology were most requested topics; Procedural skills, journal summaries and case studies were the most popular formats; 5-15 minutes were the most popular lengths	Limited to Canadian community of anesthesia residents	Level III: High Quality
5	McSwiggan, L. C., & Campbell, M. (2017)	Qualitative Study with 4 focus groups	Junior undergraduate nursing student in Scotland; 16 female, 2 male; n=18	Results indicate a need to pause the auditory lecture in need of writing notes; Indicates a potential need for written outline as supplement to podcast; Other learners indicated an ease of learning related to hearing the information as opposed to reading it; “Digital natives versus digital immigrants”	Limited to a student/teacher environment; Feedback may be influenced by other participants’ feedback (bias)	Level III: Low Quality Insufficient sample size

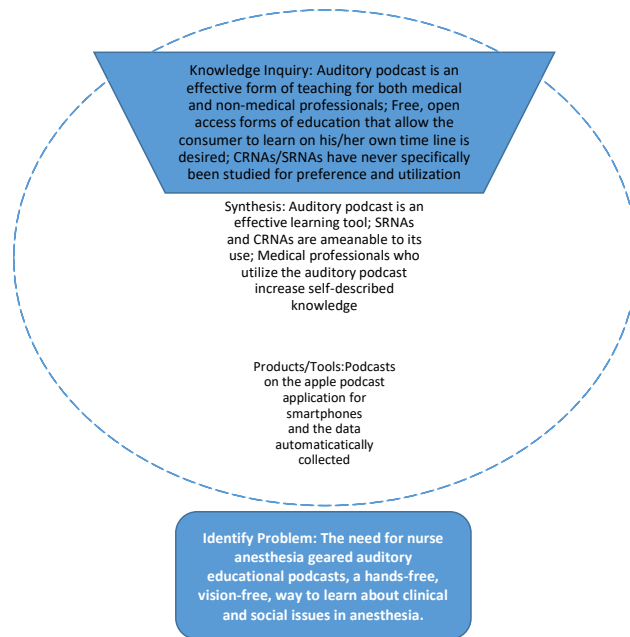
6	Merhi, M. I. (2015).	Empirical, Non-experimental study	Undergraduate and graduate students at a southern US university; Age ranged from late teens to “over 35 year”; n=352	“Motivation” and “enjoyed learning” were increased with the use of podcast because of the flexibility in time and place of use; Indicated usefulness of podcast was not directly related to ease of use	Limited to one university but includes students at all levels of learning; Data from levels were not separated;	Level III: High Quality -Definitive conclusions and comprehensive incorporation of established learning models (TAM and DoI)
7	Prakash, S. S., Muthuraman, N., & Anand, R. (2017)	Experimental Cohort Study	First year medical student in a biochemistry class; n=94	Open ended feedback survey indicated a need for ease of access and download; 3 minute length of podcast ensures more completion and less partial listeners	School setting; Sample from a medical school in India; Download and listening was optional;	Level I; Good Quality -Adequate sample size -Generalized to medical students and potentially SRNAs but not practicing professionals unless preparing for test taking (recertification exam) -Clear, reliable statistical analysis
8	Rafael, A., Rebecca, B., & María, J. B. (2017).	Randomized Control Trial	376 students enrolled in the Research Methods and Statistics course at a university in Spain; n=376	Utilization of a standardized podcast satisfaction assessment instrument, the Student Satisfaction with Educational Podcasts Questionnaire (SSEPOQ); Results help determine what makes a podcast “satisfactory” and determine criteria for improvement	Sample was exclusively students; The population is Spanish; Majority of participants were in late teens and early 20s	Level I; Good quality -Potentially lacks generalizability to all medical professionals, higher learning levels, and generations of advanced ages -High quality statistical testing with “calibration” and “validation” test samples which served as the control comparison
9	Vasilopoulos, T., Fahy, B. G., Chau, D.	Experimental Cohort Study	21 anesthesia residents and 12 fourth-year	Pre-education with audio podcasts improve	Single institution; single intervention within a niche field	Level I; Good Quality

	F., Bensalem-Owen, M., & Cibula, J. E. (2015)		medical students; n=32	scores of participants undergoing an EEG evaluation training; Medical education with podcasts are effective	(neuro-EEG); All participants had high comfort levels with technology; Participants opted in to using podcast; No randomization of implementation	-Small sample size but adequate -Sample is highly representative of population
10	Vogt, M., Schaffner, B., Ribar, A., & Chavez, R. (2010).	Experimental Cohort Study	Baccalaureate nursing students had scores on selected exam questions compared. The 2007 class (n = 63) traditional lecture format (control). The 2008 class (n = 57) received content in podcast format (experimental); n=120	No significant difference in rate of correct responses. Experimental group indicated satisfaction on post evaluation testing. Results indicate equal efficacy of podcast versus traditional lecture and a possible preference for podcast format.	Potential bias to provide satisfactory feedback by students to teacher; Potential bias to not attend class in preference for at home podcast; Age of participants not specified	Level I; Good Quality -Results only fairly definitive -Good sample size and adequate control group -More description of participants would strengthen generalizability

*Appendix D*

## Knowledge to Action Framework: The Educational Podcast Concept Map

1





**Rutgers School of Nursing**  
Stanley S. Bergen Building  
Rutgers, The State University of New Jersey  
65 Bergen Street  
Newark, NJ 07101-1709

*Appendix E*

Education Podcast Pre-Implementation Survey

1. What is your current title?
  - a. SRNA
  - b. CRNA
  - c. Other
2. To which gender do you most identify?
  - a. male
  - b. female
  - c. other
3. What is your age in years?  
Answer free text
4. Do you know what a "podcast" is?
  - a. yes
  - b. no
5. Have you ever listened to a podcast?
  - a. yes
  - b. no

<If no, survey ends>
6. What is your preferred length of listening to a podcast?
  - a. 5 minutes or less
  - b. 5-15 minutes
  - c. 15-30 minutes
  - d. 30-45 minutes
  - e. 45-60 minutes
  - f. Longer than 60 minutes
7. Have you listened to a podcast in the last year?
  - a. yes
  - b. no
8. Have you listened to a podcast within the last 30 days?
  - a. yes
  - b. no
9. Do you listen to any podcasts for educational purposes?



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- a. yes
- b. no

<If no, survey ends>

10. Do you listen to any podcasts on anesthesia topics? If so, how many?

- a. no
- b. 1
- c. 2-3
- d. 4 or more

11. Which of the following topics would you download and listen to? Please select all that apply.

Topics on physiology and anatomy

- Airway
- Cardiac
- Pulmonary
- Neuro
- Hepatic/Biliary
- Endocrine

Topics on pharmacology

- Induction Medications
- Opioids
- Reversal Agents
- Analgesics
- Antiemetics
- Locals Anesthetics

Regional Related Emergencies

OB Management (Blood Patch and wet tap management)

Different Approaches to MAC

Analgesia without the use of Opioids

ERAS

Anesthetic exposure in the environment

Shortage of LAs and kits

Case Study presentations

Journal article presentation and critique

Interviews with CRNAs on specialty topics (difficult airway, practicing abroad, etc)

Interviews with current SRNAs on how to succeed in clinical

Malpractice and Insurance Information

Certification Renewal

What to look for in your perfect job

Version 2 10/1/2018



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Expiration Date:



## Appendix F

### Recruitment Flyer

# The Educational Podcast: The Future Learner's Preference for Multitasking

Survey available at: [www.qualtrics.com/educationalpodcastsurvey](http://www.qualtrics.com/educationalpodcastsurvey)

Open for participation from **8 AM October 1, 2018 to 6 PM October 15, 2018**

**Research Purpose:** To define the CRNA's (Certified Registered Nurse Anesthetist) and SRNA's (Student Registered Nurse Anesthetist) learning preferences during and after their formal education within the realm of auditory learning, specifically through the assessment of current podcast listening habits.

**Research Description:** This research survey consists of 11 questions which will require 5-10 minutes to complete; The first 3 questions pertain to your demographic information (age, sex and title). Questions 4-10 explore your current podcast listening habits. Question 11 asks you to select all that apply: Which topics within anesthesia interest you most?

If you choose to voluntarily take part in this survey, your identity and electronic device are not recorded, but only one survey may be completed per electronic device to decrease the chance of duplicate participants.



#### Contact

For further information about this study, please contact the principal investigator, Grace Davidson at [gdd22@sn.rutgers.edu](mailto:gdd22@sn.rutgers.edu) or 817-395-3476

#### Eligibility

- ☐ Must have the title of SRNA or CRNA

#### Benefits

- ☐ No cost to participant
- ☐ Contribute to research to better serve the nurse anesthesia community's learning needs



**RUTGERS**

7/27/2018  
Version 1.0



**RUTGERS | eIRB  
APPROVED**

IRB ID:  
Approval Date:  
Expiration Date:

*Appendix G*

## Permission Granting the Ability to Post Advertisement Flyer


Facebook Group "CRNAs and SRNAs" granted by Cherie Jennings, CRNAs and SRNAs  
Facebook Group Administrator

9/9/18

To Whom It May Concern,

I, Cherie Jennings, grant Grace Davidson the principle investigator for the Educational Podcast DNP project, full permission to post her advertisement flyer in the Facebook group "CRNAs & SRNAs".

Please feel free to contact me with any concerns or questions.

Regards,  


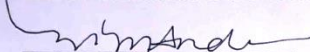
Cherie L. Jennings, CRNA  
CRNA - SRNA FB group administrator  
915-203-0209

Twitter, Instagram, and Facebook Page owned by New Jersey State Association of Nurse Anesthetists permission granted by State President, Maureen McCartney-Anderson and Social Media Coordinator, Caitlin Krenek

September 10, 2018

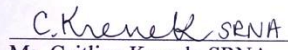
Dear Internal Review Board,

I, Dr. Maureen McCartney-Anderson the acting President of the New Jersey Association of Nurse Anesthetists, grant Grace Davidson full permission to post her advertisement flyer for The Educational Podcast: The Future Learner's Preference for Multitasking DNP project flyer to the New Jersey Association of Nurse Anesthetists' Facebook group, Twitter account and Instagram account as attached to this document.

 9/10/18

Dr. Maureen McCartney-Anderson, CRNA, DNP, APN

I, Caitling Krenek the acting student representative of the New Jersey Association of Nurse Anesthetists and operator of social media accounts, grant Grace Davidson full permission to post her advertisement flyer for The Educational Podcast: The Future Learner's Preference for Multitasking DNP project flyer to the New Jersey Association of Nurse Anesthetists' Facebook group, Twitter account and Instagram account as attached to this document.

 9/10/18  
Ms. Caitling Krenek, SRNA

### The Educational Podcast: The Future Learner's Preference for Multitasking

Survey available at: [www.qualtrics.com/educationalpodcastsurvey](http://www.qualtrics.com/educationalpodcastsurvey)  
Open for participation from 8 AM September 1, 2018 to 6 PM September 15, 2018

**Research Purpose:** To define the CRNA's (Certified Registered Nurse Anesthetist) and SRNA's (Student Registered Nurse Anesthetist) learning preferences during and after their formal education within the realm of auditory learning, specifically through the assessment of current podcast listening habits.

**Research Description:** This research survey consists of 11 questions which will require 5-10 minutes to complete; The first 3 questions pertain to your demographic information (age, sex and title). Questions 4-10 explore your current podcast listening habits. Question 11 asks you to select all that apply: Which topics within anesthesia interest you most?

If you choose to voluntarily take part in this survey, your identity and electronic device are not recorded, but only one survey may be completed per electronic device to decrease the chance of duplicate participants.



#### Contact

For further information about this study, please contact the principle investigator, Grace Davidson at [gd922@rn.rutgers.edu](mailto:gd922@rn.rutgers.edu) or 817-395-3476

#### Eligibility

- Must have the title of SRNA or CRNA

#### Benefits

- No cost to participant
- Contribute to research to better serve the nurse anesthesia community's learning needs

*Appendix H*

## Podcast Data Collection Sheet

Podcast Data Collection Sheet

Item	Frequency
Episode 1 Downloads	
Episode 2 Downloads	
Episode 3 Downloads	
Episode 4 Downloads	
Number of subscribers	

*Appendix I*

Running head: PODCAST

1



**Rutgers School of Nursing**  
 Stanley S. Bergen Building  
 Rutgers, The State University of New Jersey  
 65 Bergen Street  
 Newark, NJ 07101-1709

*Appendix G***CONSENT TO TAKE PART IN A RESEARCH STUDY**

**TITLE OF STUDY:** The Educational Podcast: The Future Learner's Preference for Multitasking

**Principal Investigator:** Grace D. Davidson, BSN, SRNA

You are being asked to participate in a research study that is being conducted by Grace Davidson, RN, BSN at the Rutgers University, School of Nursing.

This informed consent form provides information about a research study and what will be asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part in it, you should feel free to ask them and should expect to be given answers you completely understand. It is your choice whether to take part in the research. Your alternative to taking part is not to take part in the research.

After all of your questions have been answered and you wish to take part in the research study, you will be asked to sign this informed consent form. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form.

**Who is conducting this research study?**

Grace Davidson, BSN, SRNA is the Principal Investigator of this research study. A Principal Investigator has the overall responsibility for the conduct of the research. However, there are often other individuals who are part of the research team.

Grace Davidson may be reached at [gdd22@sn.rutgers.edu](mailto:gdd22@sn.rutgers.edu) or 817-395-3476.

**Why is this study being done?**

The purpose of this study is to establish CRNA's and SRNA's current podcast listening habits, preference for format, and topics of interest within the podcast realm.

**Why have I been asked to take part in this study?**

You may only take part in this study if you are recognized as a Certified Registered Nurse Anesthetist or Student Registered Nurse Anesthetist within the United States.

**How long will the study take and how many subjects will take part?**

If you choose to complete the survey, it will take approximately 5-10 minutes to complete the 11 multiple choice questions. You will be one of approximately 100 participants.

**What will I be asked to do if I take part in this study?**

The survey includes questions about your demographic information, current podcast listening habits, and which topics may interest you in future podcasts.



## PODCAST

2

**What are the risks and/or discomforts I might experience if I take part in this study?**

No risks are anticipated from taking part in this study. If you feel uncomfortable with a question, you can skip that question or withdraw from the study altogether. If you decide to quit at any time before you have finished the questionnaire, your answers will NOT be recorded.

**Are there any benefits to me if I choose to take part in this study?**

There is no direct benefit to you for participating in this study. Your participation to the research study is greatly appreciated and makes a contribution to a limited body of knowledge about CRNA's and SRNA's podcast utilization. Your feedback and input will be considered in the creation of a future podcast geared towards the education of CRNAs and SRNAs.

**What are my alternatives if I do not want to take part in this study?**

Participation in this study is voluntary. The only alternative to this study is not to participate.

**How will I know if new information is learned that may affect whether I am willing to stay in the study?**

Your participation is voluntary; you are free to withdraw your participation from this study at any time. If you do not submit the online survey your answers and participation will not be recorded.

**Will there be any cost to me to take part in this study? Will I be paid to take part in this study?**

There will be no awards or compensation offered for your participation.

**How will information about me be kept private or confidential?**

Your responses will be kept completely confidential. As the principle investigator, I will NOT know your name or the identity of the electronic device you utilize to complete the survey. I will see your individual survey response. All information you provide will be treated confidentially under password protected software only accessible by the principle investigator. There are no foreseeable risks to participation.

**Who can I call if I have questions?**

If you have questions about your rights as a research subject, you can call the IRB Director at: *Newark Health Sciences (973)972-3608* or the Rutgers Human Subjects Protection Program at (973)972-1149 in Newark.

**Agreement to participate:** As the consent will be offered and obtained online, no signature will be collected from subjects. By clicking the key below that states "I agree" and progressing onward to the survey, you are consenting to the following statement "I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study".

Version 2 9/10/2018



IRB ID:  
Approval Date:  
Expiration Date:

*Appendix J*

## Summary of Survey Results

		What is your current title?	
		CRNA	SRNA
Do you know what a "podcast" is?	Yes	174	111
	No	3	1
	Total	177	112
Have you ever listened to a podcast?	Yes	153	105
	No	21	6
	Total	174	111
What is your preferred length of listening to a podcast?	5 minutes or less	5	3
	5-15 minutes	24	11
	15-30 minutes	54	41
	30-45 minutes	48	29
	45-60 minutes	18	14
	Longer than 1 hour	4	6
	Total	153	104
Have you listened to a podcast in the last year?	Yes	140	101
	No	13	3
	Total	153	104
Have you listened to a podcast within the last 30 days?	Yes	101	73
	No	52	31
	Total	153	104
Do you listen to any podcasts for educational purposes?	Yes	101	93
	No	52	11
	Total	153	104
Do you listen to any podcasts on anesthesia topics? If so, how many?	No	77	15
	1	33	39
	2 to 3	37	42
	4 or more	6	8
	Total	153	104



## Appendix K

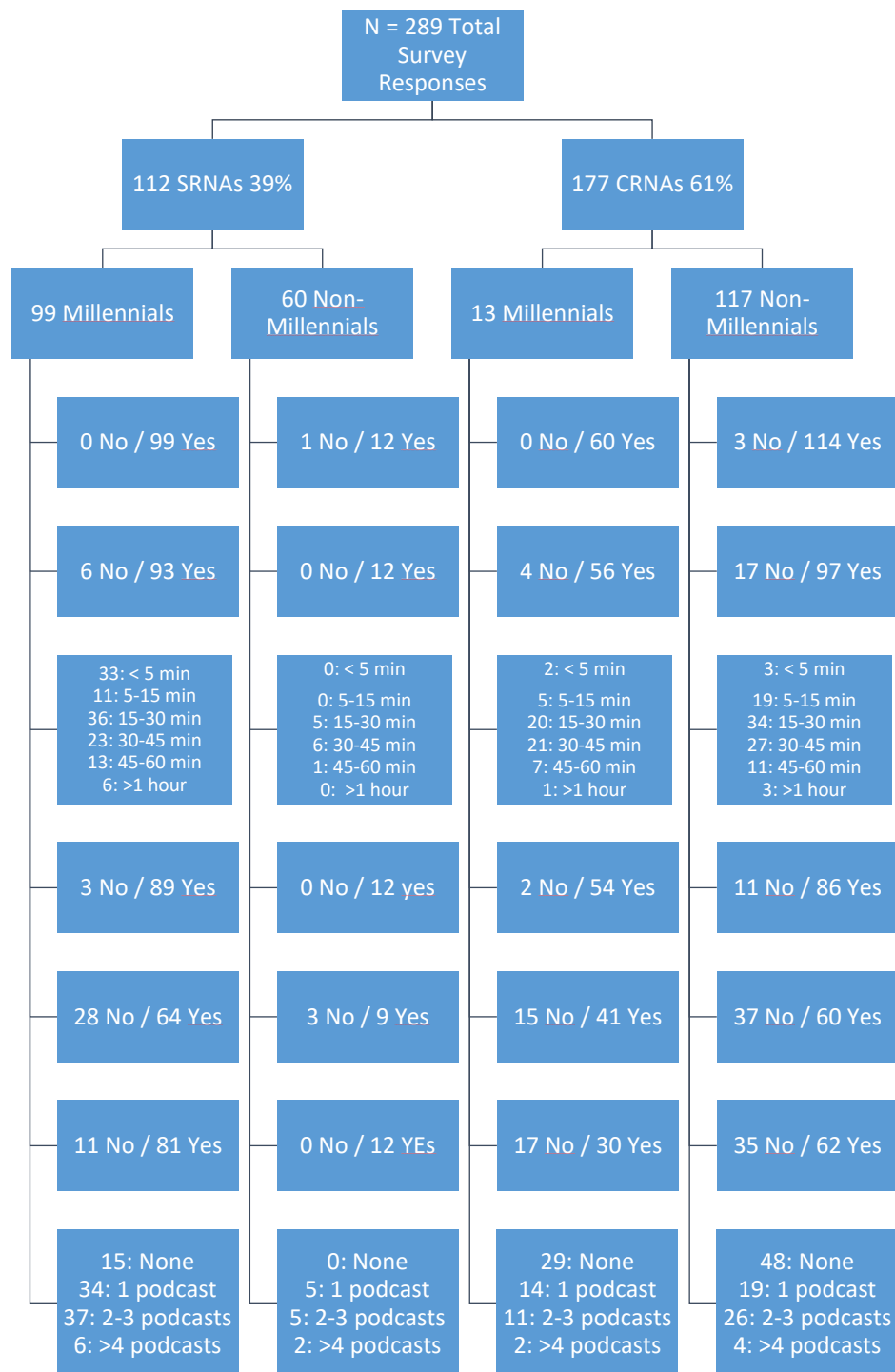
## Pre-implementation Survey Results by Millennial Status and Title in Percentage





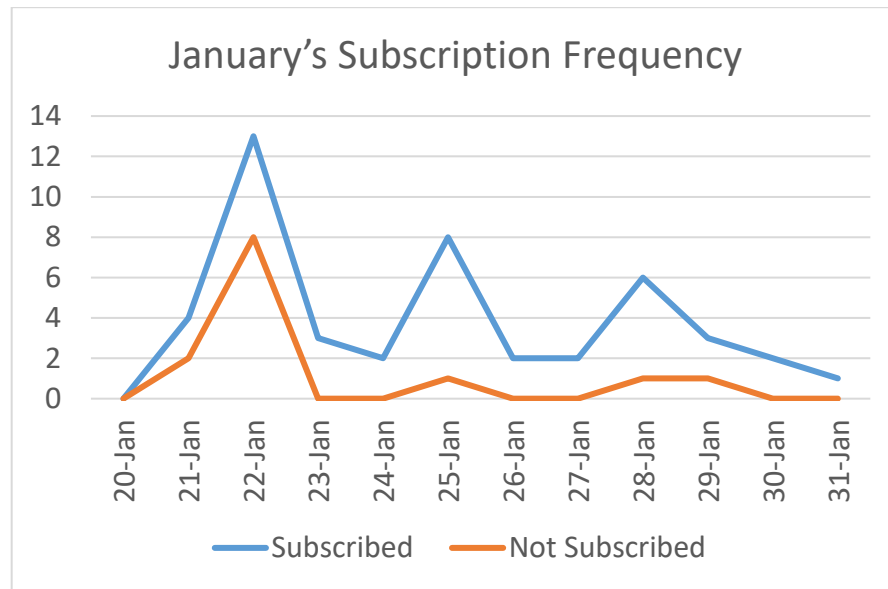
*Appendix L*

## Pre-implementation Survey Results by Millennial Status and Title in Frequency



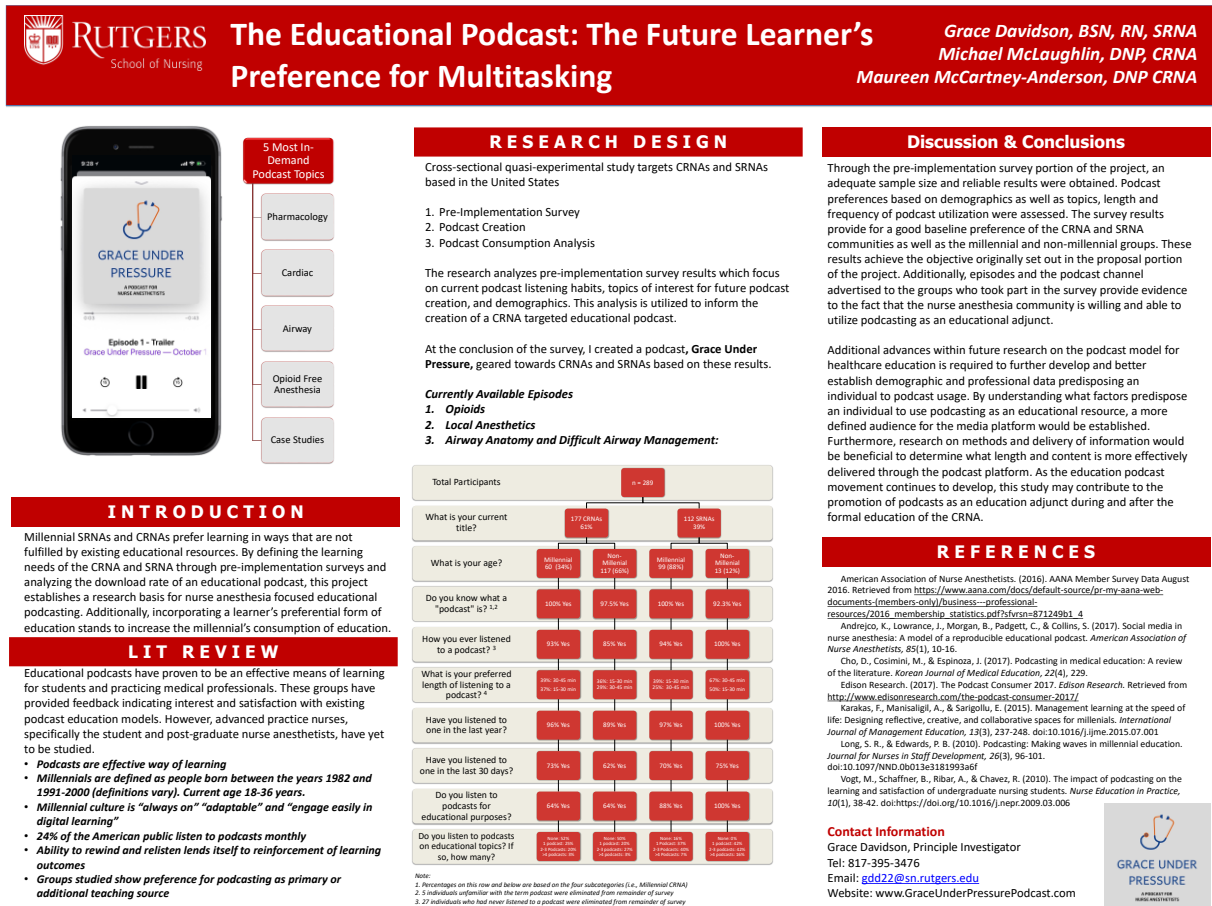
*Appendix M*

Download and Subscription Rate Graph



## Appendix N

## The Educational Podcast Poster Presentation



Note:

- Percentages on this row and below are based on the four subcategories (i.e., Millennial CRNA)
- 5 individuals unfamiliar with the term podcast were eliminated from remainder of survey
- 27 individuals who had never listened to a podcast were eliminated from remainder of survey
- Only most selected options displayed