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## Podcasts as a Learning Adjunct in Nurse Anesthesia Education

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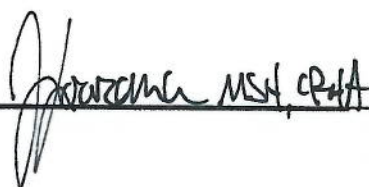
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### **Abstract**

Educational techniques are constantly evolving because of influences from technology and improvements in the resources that are available to educators as well as learners. An educational adjunct, such as a podcast, may help students study by listening and using repetition as a way to strengthen previously learned concepts. Current literature suggests that utilizing podcasts in addition to conventional educational methods contributes to a higher level of satisfaction among learners. The goal of this translational research project was to provide student registered nurse anesthetists (SRNAs) with educational podcasts as an adjunct to their traditional learning process and then measure their satisfaction after listening to the podcasts. A series of six educational podcasts were recorded and made available on *From the Head of the Bed*, which is a free podcast platform for the anesthesia community that is available to Apple, Android, Spotify, or Rich Site Summary (RSS) users. The intervention of using educational podcasts was intended to supplement and reinforce traditional learning practices in nurse anesthesia education. A mixed methods study design was developed to assess the qualities of the learners as well as their satisfaction with the educational podcasts. A post-intervention anonymous online survey was administered to the SRNAs at Marian University. The results of this project provide additional support for the value of podcasts as a learning adjunct for SRNAs.

**Keywords:** Podcasts, learning, education, nurse anesthesia, SRNA, CRNA, SSEPQ

## Podcasts as a Learning Adjunct in Nurse Anesthesia Education

### **Introduction**

Utilizing technology in education has made options like podcasting, a new and popular way to engage learners and provide variety to the educational process. People learn in different styles and settings, and this realization has created a paradigm shift in the delivery of education. This shift also reveals millennial learners' preferences toward education, which include stimulating activities as well as the option to accomplish concurrent activities while learning. Student Registered Nurse Anesthetists (SRNAs) have demanding schedules between clinicals and didactic responsibilities, leaving little time available to study and review clinical concepts. A previous systematic review of the literature revealed that podcasts improve test scores and are a satisfactory method of disseminating educational information to students in this modern era of learning where they enjoy multitasking and studying with technology (Scheil, 2018). Even though educational podcasts do exist, there are very few that are related to anesthesia.

### **Background**

According to Rainsbury and McDonnell (2006), a podcast is “a whole new medium for disseminating news, views, and education as a downloadable audio or video file to store in your pocket and listen to or view at your leisure (p. 481).” An educational podcast can be developed based on expert content that is then recorded on a computer and uploaded to a service, allowing listeners to download or stream the episodes that they choose (Andrejco, Lowrance, Morgan, Padgett, & Collins, 2017). An overarching advantage of podcasting is the unique ability for learners to multitask by listening to them while driving, cooking dinner, cleaning, or working out, which makes efficient use of time that would otherwise be unavailable for other, more traditional forms of learning (Wolpaw & Toy, 2018). SRNAs experience intense workloads with

limited time for additional responsibilities. Current literature suggests podcasts are advantageous for learners who want supplementary information at their fingertips.

### **Problem Statement**

It is clear that podcasts could be an important, but as of yet underexplored, learning adjunct in nurse anesthesia education. Proposing an intervention to develop, produce, and measure the satisfaction of podcasts focused on educational anesthesia content can be a valuable reinforcement tool for traditional learning.

### **Review of Literature**

This literature review was undertaken to understand the current state of podcasts as possible adjuncts in higher education. Many of the studies reviewed were similar in their purposes to assess whether podcasts are an effective tool as an alternative learning strategy however, their study designs testing that hypothesis varied slightly. Alternative methods of podcast implementation in education were also explored. For the purpose of this literature review, the term “traditional learning modalities” refers to either in-class lectures or reading a textbook. The chosen articles have been reviewed under three distinct subheadings: podcasts vs. traditional learning modalities, podcasts in conjunction with traditional learning modalities, and alternative podcast implementations.

#### **Podcasts vs. Traditional Learning Modalities**

Four publications, two randomized controlled trials and two quasi-experimental studies analyze data to determine whether test scores are higher after students learn by listening to podcasts or after a combination of classroom lectures and textbook readings. McKinney, Dyck, and Lubar (2009) determined that listening to a podcast lecture is an advantage over attending a traditional lecture ( $p \leq 0.05$ ). McKinney et al. (2009) also noticed a favorable quality among

educational podcasts which gave the learner the ability to listen to the podcasts as many times as they wanted. This attribute allows the learner to review any of the content in a purposeful and topic-specific way that traditional lectures do not. Conversely, another early quasi-experimental study published by Vogt, Schaffner, Ribar, and Chavez (2010) found there to be no statistically significant improvement in the scores of three different exams ( $p=0.22$ ,  $p=0.06$ ,  $p=0.11$ ) when administered to two groups of undergraduate nursing students ( $n=120$ ), one who received a traditional lecture and one who received an audio podcast. A more recent randomized controlled trial published by Back et al. (2017) reviewed the effect of podcasts over textbook readings in a group of medical students ( $n=130$ ) and found that the group who listened to the educational podcasts scored significantly higher on the post-test than the group who read from textbooks ( $p<0.021$ ). Another randomized controlled trial compared two groups of second year medical residents ( $n=49$ ), one who listened to podcasts and one who learned through traditional lectures and found that the podcast arm of the study had statistically higher scores than the control group ( $p<0.01$ ) (Brust, Cooke, & Yeung, 2015).

An additional factor that should be considered is the user satisfaction of the podcast against more traditional learning methods. McKinney et al. (2009) did not test user satisfaction. Vogt et al. (2010) administered a six-question satisfaction survey that found the users to be satisfied with the podcasts, but preferred traditional lectures (63%) over the podcasts. It is possible that lack of familiarity with podcasts influenced satisfaction at a point in time when podcast development was very new. Brust et al. (2015) found no difference in user satisfaction between the podcast learners and traditional lecture learners ( $p=0.37$ ). Finally, Back et al. (2017) reports an increase in user satisfaction of podcasts over reading textbook chapters. Overall, the satisfaction of podcast use is equal to or higher than traditional learning media.



### **Podcasts in Conjunction with Traditional Learning Modalities**

Two publications, one randomized controlled trial and one quasi-experimental study analyze data to determine whether test scores are higher after students learn by listening to podcasts in addition to a combination of classroom lectures and textbook readings. Kalludi, Punja, Pai, and Dhar (2013) conducted a quasi-experimental study involving dental students (n=80) that assessed the efficacy of podcasts as a supplement to classroom lectures and textbook readings. The authors reported that the students who had access to the podcasts scored higher on the post-test than the students who did not receive the podcasts until after the exam ( $p=0.00$ ). A randomized controlled trial published by Morris (2015) assessed how podcasts and mobile self-assessments affected learning in two groups of healthcare students (n=85) by describing that supplementary podcasts and mobile assessments positively affected the learners ( $p\leq 0.05$ ).

It is valuable to include a review of the theme of user satisfaction of podcasts in conjunction with traditional learning methods. The learners in Kalludi et al. (2013) felt very strongly (91%) that the biggest advantage of podcasts was the ability to listen to them repeatedly, a common theme that has been discussed in this review. In a survey provided to the students in Morris's study, 86% felt strongly that having podcasts as a supplement to traditional learning methods enriched their learning (2015).

### **Alternative Podcast Implementations**

Two publications, both quasi-experimental studies, will be discussed for their unique attributes. In a one-arm, quasi-experimental study published by Miesner, Lyons, and McLoughlin (2017), medical residents (n=23) took pre-tests, listened to the educational podcasts, and then took post-tests which yielded a significant improvement in test scores ( $p=0.001$ ). Lien, Chin, Helman, and Chan (2018) compared two groups of medical students (n=61), one who

learned by using podcasts and the other who used blog posts, finding that knowledge was increased with both the podcast ( $p < 0.01$ ) and blog post learning ( $p < 0.01$ ), but no significant difference existed between the two ( $p \geq 0.05$ ).

Satisfaction among learners in these alternative forms of educational podcast implementation is a key point to consider in this review. In Lien et al. (2018), ["...Students liked that the podcast "taught us how to approach a clinical presentation and walked us through steps for differential and management", "was easy to listen to and kept a constant volume level", and "was good for consolidating information. (p. 7)"]. In the post-assessment survey done in the study by Miesner et al. (2017), no evaluation of satisfaction was performed, however students provided unanimously positive comments about the podcast. Another theme that is helpful to analyze is that of the activity of students while they listen to podcasts. In Lien et al. (2018) 79% ( $n=22/28$ ) of the students in the podcast arm of the study took part in different activities such as working out, driving, and eating while simultaneously listening to the podcasts. This is an interesting finding, as learning while multitasking can be perceived as an advantage to educational podcasts. The recent publication of both of these articles reveals the current feelings that learners have about educational podcasts. Literature supports the efficacy and satisfaction of educational podcasts, in addition to highlighting the lack of available research that exists regarding educational podcasts geared toward anesthesia education.

### **Practice Gap Analysis**

The literature review established that podcasts can be a useful adjunct in education, however, research does not exist to support the satisfaction of an educational podcast created for SRNAs. While Andrejco et al. (2017) set the foundation for the creation and implementation of educational anesthesia podcasts, research was not conducted to measure the effects of the

podcast. This gap presented an opportunity to create educational podcasts for SRNAs and then measure their satisfaction after the intervention was implemented.

### **Conceptual Framework**

The Keller Attention, Relevance, Confidence, and Satisfaction (ARCS) Model of Instructional Design was the framework chosen to guide the process of creating podcasts as a learning adjunct in nurse anesthesia education. The ARCS Model of Instructional Design is a method that was developed by John Keller in order to enhance the motivational interest of educational resources (Keller, 1987). While the model is made up of three different components, only the first component that involves four conceptual conditions to distinguish learners' motivation will be used as a framework in this translational research. The four conceptual conditions, including *attention*, *relevance*, *confidence*, and *satisfaction*, must be achieved in order to create and sustain motivation in the learner (Keller, 1987). The first condition suggests using methods to capture users' *attention* including active participation, variability, humor, incongruity, specific examples, and inquiry (Keller, 1987). Using anecdotes, different styles of presentation, and allowing the learner to choose the educational topics are all ways to garner and hold *attention* (Keller, 1987). *Relevance* is a condition used to motivate the learner by presenting the material in a way that the learner can connect to personal experiences and encourages them to relate the material to future applicability (Huang, Huang, Diefes-Dux, & Imbrie, 2006). Some strategies to promote relevance include using examples of previous experiences, relating instruction to future usefulness, giving learners choices, using modeling and need matching, and relating the instruction to the worth of future goals (Keller, 1987). The third condition of *confidence* pertains to the learners perceived ability to be successful with the learning task (Huang et al., 2006). Factors that can increase *confidence* include providing the learner with

goals and expectations, ensuring they understand performance requirements and evaluation criteria, giving them encouragement and support, and attributing success to effort (Keller, 1987). Lastly, *satisfaction* is based on the learner's perceived sense of achievement and utility, as well as using the newly acquired knowledge and positive feedback as reinforcements for motivation (Huang et al., 2006). Some strategies of *satisfaction* include natural consequences of learning, receiving unexpected rewards, giving verbal praise, scheduling reinforcement, and avoiding negative threats or influences during learning (Keller, 1987). Together, these four conditions create a foundation for successful learning motivation.

The ARCS Model was selected because it was presented in Andrejco et al. (2017) as a guide for nurse anesthesia educators to create educational podcasts. Andrejco et al. (2017) encouraged future researchers by stating that, "the use of the Keller ARCS Model and the logic model outlined in this article provide a guide for nurse anesthesia educators who wish to develop effective educational podcasts for the field of nurse anesthesia (p. 17)." The authors researched, outlined, and established a podcast for the anesthesia community, in addition to publishing a blueprint for the re-creation and further development of educational anesthesia podcasts in the future (Andrejco et al., 2017). The ARCS Model guided the work of Andrejco and colleagues in the development of podcasts for the anesthesia community.

### **Goals and Objectives**

The significance of creating educational anesthesia podcasts for SRNAs is to provide them with flexibility and engagement in different forms of studying. The goal of this project is to explore whether educational anesthesia podcast content provides an alternative medium in a way that will give SRNAs variety in their study plans and enrich the traditional study methods they are using already.

The overall purpose of this project is to determine the level of satisfaction that SRNAs have toward educational podcasts as a supplement to their traditional education. In a more detailed perspective, the four aims of this DNP project are: (1) to record and disseminate a series of educational podcasts that are interesting and helpful to SRNAs, (2) to motivate SRNAs to seek out and utilize alternative, relevant forms of education that are available to reinforce previously learned topics, (3) to give SRNAs confidence in their knowledge by supporting their learning with anesthesia-based educational podcasts, and finally (4) to measure the levels of satisfaction that SRNAs have toward the podcasts.

### **Project Design**

#### **Method for Translation**

The ARCS Model of Instructional Design guided the project plan to create educational podcasts for SRNAs. In accordance with the conceptual components of the ARCS model, podcast creation was managed utilizing *attention*, *relevance*, *confidence*, and *satisfaction* strategies. The condition of *attention* was the basis for podcast production. Creating a learning tool that provided variability to the learning environment by reinforcing familiar concepts through a podcast platform that offers flexibility to the learner's study plan is the foundation of the project (Keller, 1987). Other methods such as active participation through role play, personal stories, and access to references were used to capture listeners attention and participation (Keller, 1987).

The *relevance* of anesthesia topics for the SRNA participants is extremely important to the study's design, as the podcasts' topics were chosen to appeal to those interested in introductory anesthesia content. The material presented can assist the study participants in future exams, clinical experiences, and professional endeavors, making them very pertinent to a

student. The information produced in the podcast consisted of foundational anesthesia content, along with relevant personal experiences and practice recommendations. In addition, Andrejco et. al. (2017) explains that relevance is not only related to the content material but how it is presented, showcasing that podcasts are delivered in a relevant and accessible manner for SRNAs.

The condition of *confidence* was incorporated by allowing the study participants to control their own learning through the podcasts. Motivation can be increased by allowing the study participant control over which podcast(s) and how much of the podcast(s) they listened to, that way success is a direct result of the effort that was put in (Keller, 1987). Andrejco et. al. (2017) also suggests that confidence is related to the validity of the podcasts, which can be accomplished through providing show notes with references as an aide to the discussion. In addition, podcasts can provide a low-risk learning environment of the listeners choosing, which can enhance confidence (Andrejco et al., 2017).

*Satisfaction* was addressed by providing a post-intervention survey to study participants, evaluating their perceived satisfaction with the podcasts. Satisfaction may be based on personal achievement and mastery of the content presented or can stem from feedback and reinforcement (Keller, 1987). The study participants' satisfaction may continue to evolve as the learner attempts to use the newly acquired knowledge on exams or in clinical practice.

### **Stakeholder Assessment**

The SRNAs at Marian University in the class of 2020 and class of 2021 are the key stakeholders in this project. Their interest in the project stems from their desire to expand and reinforce their foundational anesthesia knowledge for the purposes of improved test scores and clinical skills and knowledge. The implementation and evaluation of the intervention is

dependent on other stakeholders as well. Drs. Alarcón, Bendayan, and Blanca are additional stakeholders as their validated tool, Student Satisfaction with Educational Podcasts Questionnaire (SSEPQ) (Appendix A), is being used to evaluate the satisfaction of the podcasts in this translational research project (Alarcón et al., 2017). Lastly, Jon Lowrance, MSN, CRNA has provided his podcast platform, *From the Head of the Bed*, as a repository for the podcast series, and therefore is another stakeholder in this project.

### **Procedure for Implementation**

After reading the article “Social Media in Nurse Anesthesia: A Model of Reproducible Educational Podcasts,” and listening to several podcasts on the show, *From the Head of the Bed*, contributing author and producer, Jon Lowrance, MSN, CRNA was contacted for advice on podcast production (Andrejco et al., 2017). Mr. Lowrance generously contributed to this project by voluntarily offering his podcast platform to host the series of educational podcasts, in addition to editing the scripts and recording and editing the podcasts. Lowrance obtained his Master of Science in Nursing after attending the nurse anesthesia program at Western Carolina University (Lowrance, 2019). He is a current practicing CRNA of four years in Portland, Maine as well as a faculty member with Landmark Learning, Cornerstone Anesthesia Conferences, and National Outdoor Leadership School (NOLS) Wilderness Medicine. Lowrance and three other CRNAs created *From the Head of the Bed* as a research project while in nurse anesthesia school. He has since continued the free, open access podcast channel independently and continues to update and create additional episodes which are accessible on Apple, Android, Spotify, and RSS (Lowrance, 2019).

While focusing on foundational anesthesia content applicable to SRNAs, it was decided that a series of six podcasts would be created. The six podcast episodes included: “Clinical Flow:

From OR Set Up Through Intubation,” “The Anesthesia Machine,” “Pharmacokinetics of Volatile Anesthetics,” “Pharmacodynamics of Volatile Anesthetics,” “IV Induction Agents,” and “Local Anesthetics.” The process of creating the podcasts began with writing scripts while using several common anesthesia textbooks as a reference. All scripts were then reviewed by Lowrance and any necessary edits were made to ensure clarity and accuracy. The podcasts were recorded using Facetime Audio on Apple devices. Lowrance used his own recording equipment to capture the audio and used editing software to make necessary adjustments to the recordings. References to the concepts discussed were provided in the show notes which can be accessed on [fromtheheadofthebed.com](http://fromtheheadofthebed.com).

A post-intervention satisfaction survey (Appendix B) was created using Qualtrics Survey Software. The survey included a required consent agreement in order to gain access, which was listed as question one. The details of the consent have been left out of Appendix B at this time. The survey asked participants for demographic information in addition to the questions in the SSEPQ (Appendix A) that measure satisfaction (Alarcón et al., 2017).

Once the podcasts were published and the survey was open, an email was sent to all Marian University SRNAs in classes 2020 and 2021, requesting their participation in this study. The email included instructions on how to access the podcasts and post-intervention survey. In addition, some of the members of the class of 2020 and 2021 were visited in person to introduce the study and to answer any questions if needed. On April 17, 2019, Lowrance released all six podcasts on his platform, making them available to the public at the same time the instructions were given. While the podcasts are accessible for free to the public, only the Marian University SRNAs were provided with instructions on how to access the post-intervention survey. After the



podcasts and survey were released, the SRNAs were given 45 days to listen to any or all of the podcast series and submit their satisfaction surveys by June 1, 2019.

### **Setting**

The setting of the podcast series is complex, as it exists in a virtual medium. As stated, the podcasts were made available on Apple, Android, Spotify, and RSS under the *From the Head of the Bed* platform. Due to the virtual nature of the podcasts, there was little ability to control the setting. Control could not be exercised in regard to when the podcasts were listened to, where they were listened to, how much of the podcast was listened to, which episodes were listened to, and how the podcasts were listened to. The setting was primarily determined by the study participants. Podcasts could have been listened to on a phone, tablet, or computer and with or without headphones. A podcast episode may have also been listened to in one setting or split up over time. The setting of where the podcasts were listened to could have varied, including the gym, car, while doing chores, while sitting down at home, and so on. The survey inquired about the setting in which the participants listened to the podcasts. A participant may have listened to one podcast episode, multiple episodes, or none at all before completing the survey. The only control was where, electronically, the podcasts and survey were accessed, as well as the time frame of 45 days that the participants had to listen to the podcasts and take the survey.

### **Participants**

The study participants included Marian University SRNAs in the classes of 2020 and 2021. These participants were chosen based on their enrollment in the nurse anesthesia program at Marian University. Only SRNAs from Marian University were selected as participants in order to maintain control over who had access to the post-intervention satisfaction survey. The class of 2020 consisted of 12 SRNAs entering their third year of the program and the class of 2021

consisted of 21 SRNAs entering their second year of the program. Participants were recruited through an email detailing the study, along with instructions on how to access the podcast series and the post-intervention satisfaction survey. In addition, several members of both classes were visited in person during a school meeting to promote participation in the study, as well as to answer any questions. Participants were not offered any reward or compensation for participation in this study.

### **Perceived Barriers**

Perceived barriers associated with this study include time commitment, technology, and motivation. The podcast episodes ranged from 28 to 55 minutes. One particular study of anesthesia residents measured podcast use and content and found that the preferred length of podcasts was less than 30 minutes, and a podcast was less likely to be listened to if it exceeded 45 minutes (Matava, Rosen, Siu, & Bould, 2013). Therefore, the increased length of five out of the six podcasts is a barrier to getting listeners to stay engaged through the entire episode. The series of six podcasts totaling 260 minutes and 44 seconds, is an extensive time commitment for SRNAs, however, it is anticipated that a desire to acquire educational anesthesia content in a non-traditional format will be embraced by the study participants. Technology is also a barrier due to predicted differences in experience with podcasts in regard to accessing the platform and either downloading or streaming the content. Access to technology required to listen to the podcasts is not barrier, as all students in the nurse anesthesia program at Marian University are provided with an iPad. The iPad is capable of downloading and playing the podcasts with an adequate Wi-Fi connection which is also provided at Marian University. Lastly, motivation is the most significant perceived barrier, because this study relies heavily on intrinsic motivation from the participants and is not within the control of the study design.

## Methods

### Measurement Instrument

The SSEPQ tool (Appendix A) addressed satisfaction related to the podcast series through a 10-question Likert-type scale with four response options (Alarcón et al., 2017). Based on the SSEPQ, satisfaction is measured in relation to perceived content adequacy, ease of use, and usefulness and benefits. This tool was developed by Alarcón, Bendayan, and Blanca (2017) in order to create a brief and simple questionnaire evaluating satisfaction with educational podcasts in higher education and has standardization data. The creators of the tool are considered to be experts, as they all are doctoral recipients and have experience with teaching or supporting teaching in undergraduate research method courses. In order to standardize this tool, 376 students in a psychology course were enrolled in a study and presented with 11 educational podcasts created by the authors of the psychology course. The podcast could be freely accessed throughout the year, and on the last day of the course, the SSEPQ was administered to the students. The four response options per question pertain to a score of 1-4 resulting in an overall max score of 40 (Alarcón et al., 2017). The SSEPQ tool was standardized using Cronbach's alpha to determine internal consistency and was created with a one-factor structure in order for the total score of the questionnaire to provide an overall index of students' satisfaction with educational podcasts (Alarcón et al., 2017). Permission was obtained via email from Dr. Alarcón to use the SSEPQ tool in this study.

### Data Collection Procedure

Based on the Keller ARCS Model of Instructional Design and the condition of *satisfaction*, the method for evaluation involved creating a post-intervention satisfaction survey (Appendix B) using the SSEPQ (Appendix A) (Alarcón et al., 2017; Andrejco et al., 2017).

Demographic information was also elicited to further hypothesize on the results of the satisfaction survey. Information regarding how to access the survey and when to take it was included in the email used to recruit participants for the study. While the podcast is on a free, open access platform available to the public, the post-intervention satisfaction survey access was only shared with Marian University SRNAs. It should be noted that this method does not allow the experimenter to control at what point during the 45-day period the participant takes the survey. It was suggested to the study participants that the survey should be completed after the participant had listened to all the podcast episodes that they planned on listening to within the 45-day period. Data collected was then analyzed and also compared to the results from Alarcón et al. (2017), which was used to validate the SSEPQ tool (Appendix A), in order to evaluate the effectiveness of the study.

After the post-intervention satisfaction survey window had closed, the data were gathered from the Qualtrics Survey Software and analyzed. The survey consisted of 20 questions where one was the consent to participate in the research, nine were demographic questions, and 10 were the SSEPQ items. The results from the demographic questions were entered into Table 1C (Appendix C) to be analyzed for patterns related to the DNP survey results from the SSEPQ. The SSEPQ was scored identically to the standardized results from Alarcón et al. (2017) so that direct comparisons between the results could be made. The mean scores from the SSEPQ and the standardized data were entered into a table (Table 2) so that the differences in the scores could be analyzed.

### **Data Analysis**

The qualitative and quantitative data obtained from the post-intervention satisfaction survey (Appendix B) was arranged to create two tables, Table 1C and Table 2. While this study

does not lend itself to parametric comparisons, results were compared with the SSEPQ standardization data (Alarcón et al., 2017). The quantitative data were scored by giving each of the 10 questions a point value from 1-4 depending on how the participant answered the question. The corresponding scores for the response were: strongly agree for 4 points, agree for 3 points, disagree for 2 points, and strongly disagree for 1 point. The mean scores for each question appear in Table 2 alongside the standardized scores from the SSEPQ, as well as the difference in the two scores which demonstrate a comparison.

### **Results**

Partially completed surveys were counted in addition to the completed ones, and because of that the sample size ranged from 23 to 26 participants depending on the particular question. The demographic data can be found in Table 1C. The participants were rather equally represented between the classes of 2020 (46%, n=12) and 2021 (54%, n=14). Females made up 76% (n=19) of the sample size, and more than 80% (n=22) of the participants were between the ages of 26 and 35. 84% (n=21) of the students have been registered nurses between 3 and 10 years. Close to half (48%, n=12) of the SRNAs reported listening to podcasts 1-2 days per week or more. When participants were asked which additional learning modalities were helpful for studying, YouTube and online videos (25%) and recorded video lectures (21%) were both indicated as more useful than podcasts (18%). Twenty-two Marian University SRNAs listened to all 6 podcasts and 3 SRNAs listened to 4 podcasts total. More than half of the students reported listening to the podcasts in the car or while driving (53%), 19% listened while cooking or cleaning, 7% listened while exercising, and 12% listened to the podcasts while sitting and focusing only on the podcasts.

The SSEPQ mean comparisons can be found in Table 2. For the SRNA group, the highest mean score was 3.96 for a question that asked if the content of the podcast was well organized. The highest mean standardized score was 3.49 and measured the opinion of the ease of access of the podcasts, which happened to be the question with the lowest mean score for the SRNA group (3.71). The lowest score in the standardized group was in regard to the opinion on whether the podcasts motivate learners (2.84). The SRNA group means, out of the ten total questions, were all higher than the standardized means by a difference of at least 0.22, however statistical significance was not assessed. The range of the means in the SRNA group is very narrow, spanning a difference of only 0.25 between the highest and lowest means, where the range in the standardized results is a difference of 0.65. Typically, the results in a study with a larger sample size are less variable when compared to one with a smaller sample size, however the opposite effect can be appreciated in this study. This may be attributed to acquiescence and sponsor bias.

Table 2 Mean SSEPQ Comparisons

<b>SSEPQ Question</b>	<b>Standardized Results (mean) n=376</b>	<b>DNP Project Results mean</b>	<b>Difference</b>
1. The podcasts are easy to access	3.49	3.71 (n=24)	+0.22
2. The podcasts are useful for learning about this subject	3.34	3.88 (n=24)	+0.54
3. The podcasts motivate me to learn about this subject	2.84	3.87 (n=23)	+1.03
4. The podcasts make it easier to learn about this subject	3.28	3.91 (n=23)	+0.63
5. I am satisfied with the podcasts as a learning tool for this subject	3.44	3.87 (n=23)	+0.43
6. The podcasts provide clear information about the theoretical content of the topic	3.27	3.78 (n=23)	+0.51
7. The podcasts provide clear information about the practical content of the topic	3.16	3.91 (n=23)	+0.75
8. The content of the podcasts is well organized	3.18	3.96 (n=23)	+0.78
9. The information contained in the podcasts is academically rigorous	3.03	3.74 (n=23)	+0.71
10. The design of the podcasts makes them appealing	2.85	3.87 (n=23)	+1.02

Additionally, mean scores were analyzed based on years of experience as a registered nurse, age of the students, and between participants who listened to all six podcasts and those who listened to less than six. Nurses with 11 or more years of experience (n=4) were overall more satisfied than nurses with less than 10 years of experience (n=21). The nurses with the lowest mean satisfaction scores had between six and ten years of experience (n=12). Considering the typical relationship where age is proportional to years of experience in a profession, the results of the analysis of age compared to satisfaction scores are not surprising. The overall least satisfied students were ages 26-30 (n=16), and the most satisfied were 36 years old and older (n=4). There was no noticeable difference in satisfaction between those who listened to all six podcasts (n=22) and those who listened to less than six (n=3).

### **Interpretation/Discussion**

Almost half (48%) of the SRNAs reported listening to podcasts regularly, which may reflect on the result that 88% of the SRNAs listened to all 6 of the podcasts for this study. The SRNAs may have also been motivated to listen to the podcasts since the information in them focused on core anesthesia concepts that are discussed in clinical situations and will appear on the licensing exam required after graduation. Prior to administering the post-intervention survey, it was speculated that the podcasts would be useful for multitasking. 88% of SRNAs reported listening to the podcasts in the car or while driving, while exercising, while cooking or cleaning, or doing other activities such as bathing their child, getting ready in the morning, and mowing the lawn. Only 12% of the SRNAs reported listening to the podcasts as their sole focus. These statistics support the assumption that podcasts are a learning modality that allow students to multitask. It could be difficult to utilize other non-podcast educational tools, such as YouTube or video lectures, while participating in any of the common activities of daily living reported in the

survey. The non-podcast alternative learning modalities require the learner to view learning material as opposed to the audio-only approach that the podcasts have. SRNAs appear to listen to podcasts in addition to performing other activities simultaneously. These activities would otherwise consume time, making it unavailable for studying or using alternative, non-podcast forms of educational adjuncts.

Overall, the SRNAs had higher mean satisfaction scores than the standardized results. It is conceivable that the SRNAs were very enthusiastic about receiving an educational tool that could be used during activities that would otherwise not be spent studying. The standardized study's participants totaled 376, where the sample size in this study was much smaller, possibly accounting for the differences in mean scores. Prior to administering the satisfaction survey, it was speculated that the youngest and least experienced of the SRNAs would have been the most satisfied with the podcasts as they are likely the range of students most accustomed to learning with technology. The exact opposite was true, however, and the 26-30-year-old SRNAs and those with 6-10 years of experience as a nurse were the least satisfied. These results could also be affected by the difference in sample size between the groups compared with one another.

There were several limitations in this study. The number of possible study participants was already low at 33. The results showed that 26 participants began the satisfaction survey, but only 23 completed it. Because of the very low sample size, parametric comparisons were not able to be made. Comparisons were made against the validated SSEPQ, but the low sample size in addition to possible acquiescence and sponsor bias may have affected the results. It is also possible that the topics of the podcasts targeted a specific group of people with exactly the information they wanted to consume. This high specificity may have left the SRNAs more satisfied than the participants from the comparison study who may not have been as interested in



the topics of the educational podcasts they listened to. Although the survey retrieved data from few participants, it should be noted that in the first 45 days of the podcasts' free public access, they received 11,732 listens combined. Considering there are roughly 53,000 Certified Registered Nurse Anesthetists (CRNAs) and SRNAs in the United States, it is speculated that the educational podcasts were listened to by a large portion of the nurse anesthesia community (American Association of Nurse Anesthetists, 2019). Although no formal study was performed to assess the opinions of the public who have listened to the podcasts, the large number of listens in a relatively short period of time may suggest that podcasts are a popular way for CRNAs and SRNAs to consume educational anesthesia content.

### **Ethical Considerations/Protection of Human Subjects**

Marian University's Institutional Review Board determined the project was exempt from the need of human subjects' protections; therefore, the project was approved by the Leighton School of Nursing.

### **Conclusion**

Appealing SRNAs' attention by creating relevant educational podcasts has provided these learners with confidence in their abilities to learn and grow through using an alternative didactic adjunct. This opinion is formed based on the mean satisfaction scores obtained from the post-intervention survey that was taken by the Marian University SRNAs after they listened to the podcasts. The SRNAs' mean satisfaction scores are supported by the control mean satisfaction scores described in Alarcón et al. (2017). It is also evident that SRNAs enjoy repurposing time that would otherwise be unavailable for studying, by listening to podcasts in addition to performing other necessary activities of daily living.

Although these six educational anesthesia podcasts have sought to help close the gap around the deficit of complementary educational resources, there is an infinite amount of room left to continue to develop different types of learning modalities geared toward enhancing nurse anesthesia education.

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## Appendices

### Appendix A: Student Satisfaction with Educational Podcasts Questionnaire (SSEPQ)

ITEMS	Strongly disagree	Dis-agree	Agree	Strongly agree
1. The podcasts are easy to access <i>Los podcasts resultan fáciles de consultar</i>				
2. The podcasts are useful for learning about this subject <i>Los podcasts son útiles para el aprendizaje de esta asignatura</i>				
3. The podcasts motivate me to learn about this subject <i>Los podcasts me motivan para aprender esta asignatura</i>				
4. The podcasts make it easier to learn about this subject <i>Los podcasts facilitan el aprendizaje de esta asignatura</i>				
5. I am satisfied with the podcasts as a learning tool for this subject <i>Estoy satisfecho con los podcasts como recurso de aprendizaje para esta asignatura</i>				
6. The podcasts provide clear information about the theoretical content of the topic <i>Los podcasts muestran información clara sobre los contenidos teóricos del tema</i>				
7. The podcasts provide clear information about the practical content of the topic <i>Los podcasts muestran información clara sobre los contenidos prácticos del tema</i>				
8. The content of the podcasts is well organized <i>El contenido de los podcasts está correctamente estructurado</i>				
9. The information contained in the podcasts is academically rigorous <i>Los podcasts contienen información rigurosa desde el punto de vista académico</i>				
10. The design of the podcasts makes them appealing <i>El diseño de los podcasts es atractivo</i>				

**Appendix B: Podcasts as a Learning Adjunct in Nurse Anesthesia Education - Satisfaction Survey**

Q1 Consent (Details omitted)

Q2 Please select the year of your expected graduation date from Marian University's nurse anesthesia program

2020 (1)

2021 (2)

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Q3 Please select the age range you fit into

20-25 years old (1)

26-30 years old (2)

31-35 years old (3)

36-40 years old (4)

41-45 years old (5)

46-50 years old (6)

51+ years old (7)

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Q4 Please select your gender

- Male (1)
  - Female (2)
  - Neither (3)
  - Combo of male and female (4)
  - Prefer not to answer (5)
- 

Q5 Please select the number of years you've been a registered nurse

- 1-2 years (1)
  - 3-5 years (2)
  - 6-10 years (3)
  - 11-15 years (4)
  - 16-20 years (5)
  - 21 + years (6)
-



Q6 How often do you listen to podcasts?

- Never (1)
- Rarely (less than 1-2 times per month) (2)
- Sometimes (1-2 times per month) (3)
- Regularly (1-2 times per week) (4)
- Daily (1 or more per day) (5)
- 

Q7 Outside of traditional didactic learning, which additional educational modalities are most beneficial to you? (Select all that apply)

- Recorded video lectures (1)
- YouTube/videos online (2)
- Podcasts (3)
- Textbooks (4)
- Slide presentation notes (5)
- Other (Please specify) (6) \_\_\_\_\_
- None (7)
-

Q8 How many podcasts did you listen to out of the 6 total that were recorded with Ashley Scheil and Skyler Rouhselang on *From the Head of the Bed*?

- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 (6)
- 6 (7)
- 

Q9 Please select the podcasts that you listened to

- #44 Clinical Flow: From OR Set Up Through Intubation - Ashley Scheil (1)
- #45 The Anesthesia Machine - Ashley Scheil (2)
- #46 Pharmacokinetics of Volatile Anesthetics - Skyler Rouhselang (3)
- #47 Pharmacodynamics of Volatile Anesthetics - Skyler Rouhselang (4)
- #48 IV Induction Agents - Ashley Scheil (5)
- #49 Local Anesthetics - Skyler Rouhselang (6)
- None (7)
-

Q10 How did you listen to the podcasts? (Select all that apply)

- While driving/In the car (1)
- While cooking or cleaning (2)
- While exercising (3)
- While sitting and focusing solely on the podcasts (4)
- Other (Please specify) (5) \_\_\_\_\_
- Did not listen to any podcasts (6)
- 

Q11 The podcasts are easy to access

- Strongly agree (1)
- Agree (2)
- Disagree (3)
- Strongly disagree (4)
- 

Q12 The podcasts are useful for learning about this subject

- Strongly agree (1)
- Agree (2)
- Disagree (3)
- Strongly disagree (4)
-

Q13 The podcasts motivate me to learn about this subject

- Strongly agree (1)
  - Agree (2)
  - Disagree (3)
  - Strongly disagree (4)
- 

Q14 The podcasts make it easier to learn about this subject

- Strongly agree (1)
  - Agree (2)
  - Disagree (3)
  - Strongly disagree (4)
- 

Q15 I am satisfied with the podcasts as a learning tool for this subject

- Strongly agree (1)
  - Agree (2)
  - Disagree (3)
  - Strongly disagree (4)
-

Q16 The podcasts provide clear information about the theoretical content of the topic

- Strongly agree (1)
  - Agree (2)
  - Disagree (3)
  - Strongly disagree (4)
- 

Q17 The podcasts provide clear information about the practical content of the topic

- Strongly agree (1)
  - Agree (2)
  - Disagree (3)
  - Strongly disagree (4)
- 

Q18 The content of the podcasts is well organized

- Strongly agree (1)
  - Agree (2)
  - Disagree (3)
  - Strongly disagree (4)
-

Q19 The information contained in the podcasts is academically rigorous

- Strongly agree (1)
  - Agree (2)
  - Disagree (3)
  - Strongly disagree (4)
- 

Q20 The design of the podcasts makes them appealing

- Strongly agree (1)
- Agree (2)
- Disagree (3)
- Strongly disagree (4)

**End of Block: Consent**

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Appendix C: Table 1. DNP SRNA Participant Characteristics

<i>DNP Participant Characteristics</i>	<i>Frequency</i>
<b>Expected Graduation Date n=26</b>	<b>n</b>
2020	12 (46%)
2021	14 (54%)
<b>Age n=26</b>	
26-30	16 (61%)
31-35	6 (23%)
36-40	1 (4%)
41-45	2 (8%)
45-50	0
51+	1 (4%)
<b>Gender n=25</b>	
Male	5 (20%)
Female	19 (76%)
Prefer not to answer	1 (4%)
<b>Years as an RN n=25</b>	
3-5 years	9 (36%)
6-10 years	12 (48%)
11-15 years	1 (4%)
16-20 years	2 (8%)
21+ years	1 (4%)
<b>How often do you listen to podcasts? n=25</b>	
Never	2 (8%)
Rarely (less than 1-2 times per month)	5 (20%)
Sometimes (1-2 times per month)	6 (24%)
Regularly (1-2 times per week)	10 (40%)
Daily (1 or more per day)	2 (8%)
<b>Outside of traditional didactic learning, which additional educational modalities are most beneficial to you? n=84</b>	
Recorded video lectures	18 (21%)
YouTube/Videos online	21 (25%)
Podcasts	15 (18%)
Textbooks	14 (17%)
Slide presentation notes	14 (17%)
Other (Hands-on/simulation)	2 (2%)
<b>How many podcasts did you listen to out of the 6 total that were recorded with Ashley Scheil and Skyler Rouhselang on From the Head of the Bed? n=25</b>	
0	0
1	0
2	0
3	0
4	3 (12%)
5	0
6	22 (88%)
<b>How did you listen to the podcasts? n=43</b>	
While driving/in the car	23 (53%)
While cooking or cleaning	8 (19%)

While exercising	3 (7%)
While sitting and focusing solely on the podcasts	5 (12%)
Other (getting ready in the morning, bathing child, mowing lawn)	4 (9%)