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Using an Artificial Real-Time Response Audience in Online Sales Education to Improve Self-Efficacy in Sales Presentations: An Online Classroom Innovation

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Using an Artificial Real-Time Response Audience in Online Sales Education to Improve Self-Efficacy in Sales Presentations: An Online Classroom Innovation

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Abstract – Sales education research recently has turned its attention to using artificial intelligence (AI) technology, but much remains in our understanding of its use in the online and virtual sales education environment. AI can be useful for helping online students improve their sales presentations and vocal delivery skills. Examined through the lens of control value theory, this study is a pilot investigation into AI's effectiveness. Based on a paired samples *t*-test, our results indicate that student use of AI technology is effective in improving self-efficacy for sales presentations while also significantly improving vocal delivery skills, including pitch, pace, volume, and pausing. Theoretical and practical implications to teaching vocal presentation skills in sales education are discussed.

Keywords – sales education, online learning, artificial intelligence, sales presentations, vocal delivery skills, self-efficacy

Relevance – The increased need for online and virtual education can be challenging for sales and marketing educators. Face-to-face interaction is often lacking in the online learning environment, and adequately measuring student practice sessions can be challenging. This study may assist educators in considering the use of AI to improve vocal delivery skills for sales presentations. The current study's results indicate that students' use of AI technology is effective in improving their overall self-efficacy for sales presentations while also significantly enhancing their vocal delivery skills.

Introduction

Sales education is continually growing and innovating, and the demand for sales-ready graduates remains a focus for employers (Dixon and Peltier, 2013; Crittenden et al., 2019; Deeter-Schmeltz and Peltier, 2019). It is critical that academic research analyze the effectiveness of projects, classroom exercises, role-plays, simulations, and digital innovation, particularly when it comes to university programs preparing students for professional sales (Cummins et al., 2013; Bolander et al., 2014; Crittenden et al., 2019; Deeter-Schmeltz, 2019). Every year, millions of students are educated online, and preparing these students to succeed upon graduation presents different challenges than face-to-face (F2F) courses (Watts, 2016; Seaman et al., 2018). Furthermore, online virtual learning is expected to continue gaining popularity (Croxton, 2014). Based on the increasing need for online virtual education, university instructors need interactive tools to adapt

to the difficult circumstances that arise in courses that require a higher level of hands-on learning (Krupnick, 2020). Scholars have called for university educators to "continually innovate with digital curriculum, and with practical digital tool usage" (Crittenden and Crittenden, 2015: 12). Researchers have shown that exposing students to artificial intelligence (AI) technology and its potential benefits within sales education can be favorable (Singh et al., 2019; Crittenden and Biel, 2019). However, the effectiveness of using AI innovations in online sales education, still remains unclear.

One such innovation is to use AI to improve sales students' self-efficacy in sales presentations while coaching skills such as voice pitch, pace, pausing, volume, and verbal distractors. Within courses designed to improve students' presentation skills, it can be difficult to improve students' self-efficacy and vocal delivery skills without face-to-face interactions; meanwhile, the practice sessions can be difficult for the instructor to measure and give feedback (Brookfield and Preskill, 2005). We argue that this problem is an important consideration for sales research because studies show a correlation between voice characteristics, vocal delivery skills, and salesperson credibility and influence (Castleberry and Tanner, 2019; Peterson et al., 1995). Additionally, salespeople are often cognitively evaluated by customers on their nonverbal and verbal communication (Hall et al., 2015). Within university sales education, it is common for sales students to be evaluated in sales competitions using oral presentation rubrics measuring vocal delivery skills (Widmier et al., 2007). Unfortunately, in the online learning environment, it is harder for students to gain experience and adequate practice (Croxton, 2014; Howard, 2015) compared to face-to-face students. In F2F environments, presentations can help students role play and receive feedback from mock "customer" audiences while receiving real-time feedback from the instructor to improve future practice sessions.

Simulating this environment in online sales courses can be difficult. Without these kinds of interactions, online sales students need to be able to regularly practice and improve their vocal delivery skills in ways that improve self-efficacy in providing presentations that impact customers. For instance, they may need to work on voice pitch, pace, pausing, volume, and verbal distractors in their sales presentations. Such practice ensures that they will have adequate confidence to perform on the job. Advancing digital technologies such as AI and machine learning hold strong potential in assisting sales education instructors to adequately help students gain confidence and skill in sales presentations (Crittenden et al., 2019). Recently, AI technology has started to provide valuable automated solutions to industry problems while responding to customer needs (Syam and Sharma, 2018). Academically, it has been used to analyze sales conversations; for example, one study examined a salesperson's speaking versus listening time with a customer on a sales call (Deeter-Schmeltz, 2019). Sales education research can help educators in expanding their use of AI tools and machine learning technology by testing their effectiveness in helping online students improve their self-efficacy for sales presentations. It is essential that we explore these pedagogical tools in order to encourage innovation and advancement in sales education (Crittenden et al., 2019).

The present study seeks to explore the effectiveness of using AI and machine learning technology as tools for increasing online students' self-efficacy in sales presentations and vocal delivery skills. This article aims to respond to the urgent call for research that encourages pedagogy and methods that promote the skills desired by potential employers within sales and marketing education (Deeter-Schmeltz and Peltier, 2019). This research is relevant given that online sales students need to be able to effectively practice and improve self-efficacy in their

vocal delivery skills for sales presentation skills in a way that impacts customers. In this study, students' self-efficacy in their own vocal delivery skills; confidence in providing an engaging sales presentation; and individual student measurements of vocal pitch, pace, volume, and pauses will be measured pre- and post-intervention.

Theoretical Framework

Utilizing control value theory, this study investigates how an AI, real-time response audience used by students in an online classroom improves confidence in sales presentations and improves critical vocal delivery skills. Control-value theory posits that students typically experience positive emotions when performing educational tasks if the outcome is due to having a high sense of control in their trajectory of success (Pekrun, 2006; Luo et al., 2016). This study posits that the real-time feedback provided by the AI innovation allows students to feel a "high-sense of control" while they work through improving their self-efficacy in sales presentations and individual vocal delivery skills. It is also important to note that "individuals who have positive self-efficacy beliefs focus their attention and motivation on the tasks necessary for achieving targeted performance levels and persevere in the face of difficulty" (Brown, Jones, and Leigh, 2005: 974). Because students have immediate feedback through the AI innovation, they can easily control their practice efforts for improvement.

Research Question and Hypotheses

Does student use of AI tools such as real-time response audiences for sales presentations improve self-efficacy in sales presentations and individual vocal delivery skills in online sales education? We propose the following hypotheses in order to explore our research question regarding the use of AI real-time response technology in an online classroom.

H1a: The online students will improve their self-efficacy in sales presentations by using the AI classroom innovation.

H1b: The online students will improve their self-efficacy in vocal delivery skills by using the AI classroom innovation.

H2a: Students' vocal pitch will improve by using the AI classroom innovation.

H2b: Students' pace will improve by using the AI classroom innovation.

H2c: Students' pace variability will improve by using the AI classroom innovation.

H2d: Students' vocal delivery skill will improve by using the AI classroom innovation.

H2e: Students' pauses will improve by using the AI classroom innovation.

Literature Review

Self-Efficacy and Vocal Delivery

Knight et al. (2014: 156) studied self-efficacy in sales education and encouraged future researchers to explore "specific methods for sales educators to more effectively develop sales-based self-efficacy to prepare students to be well-prepared to 'hit the ground running' in the early stages of their sales careers." Self-efficacy involves a comprehensive summary of a person's perceived skillfulness in performing a certain task (Bandura, 1977). The extant literature defines self-efficacy as a person's perceived ability or expectations about his or her own capabilities to perform, and it has been empirically shown to positively impact sales performance (Bandura, 1977; Barling and Beattie, 1983; Fu et al., 2010). Wang and Netemeyer (2002) show that self-efficacy is impacted by students' actual learning effort. It is also important to note that "individuals who have positive self-efficacy beliefs focus their attention and motivation on the tasks necessary for achieving targeted performance levels and persevere in the face of difficulties" (Brown et al., 2005: 974). Empirical studies find that people who have greater self-efficacy tend to achieve better performance (Gist and Mitchell, 1992). Unfortunately, it can be more difficult for online sales education students to gain adequate self-efficacy because they do not have as much face-to-face practice with instructors and peers. Moreover, practicing vocal delivery skills online is not easy. Sales education instructors tend to find it challenging to evaluate students and provide helpful feedback for students seeking to improve their vocal delivery skills, such as pitch, pace, volume, and pausing—obviously important skills for budding sales professionals. As Peterson et al. (1995) note, successful salespeople are effective in selling situations because they have mastered vocal articulation, rate, duration, and pauses during their sales pitches. Peterson et al. (1995) also find that customers respond more favorably to salespeople when the salespeople decrease their total speaking time by shortening the length of pauses between words and sentences.

Artificial Intelligence (AI) and Machine Learning in Sales Education

Research suggests that experiential learning in sales education is a critical component to positive learning outcomes (Inks and Avila, 2008). Classroom interaction provides opportunities to receive real-time feedback for adequate skills improvement, which can increase confidence (Fassinger, 1995). Given the advances in technology and increased availability of technologies like AI and machine learning, it is feasible that students can interact in "real-life" presentations with real-time responses by a simulated audience in an online environment. However, there is a need to explore effective pedagogy in order to improve administration of these tools (Peterson et al., 1995). Current advancements in AI create the technology to provide "real-world" role-playing scenarios (Deeter-Schmeltz, 2019). Within various industries, AI is transforming the sales-customer environment by helping salespeople and companies identify their customers' buying patterns (Zaledonis, 2019). Most overwhelmingly, AI technology is helping to replace the automated and mundanely routine tasks of daily sales operations (Afshar, 2018). For example, AI advancements can help the online sales instructor with routine tasks like student presentation feedback. If done well, such feedback can greatly benefit student self-efficacy and overall improvement.

Innovation Assessment

The AI innovation used in this study is an online cloud-based presentation recording tool called PitchVantage. The program uses a combination of artificial intelligence and machine learning to provide real-time presentation feedback to students. The program utilizes a simulated "real-time" audience that responds by giving nonverbal cues to the presenter during the live presentation based on the quality of the presentation and the student's vocal delivery skills. PitchVantage uses AI and machine learning to compare student presentations to a database of 10,000+ samples evaluated by experts and then provides personalized coaching based on the analysis. During their presentations, students are automatically measured and given feedback for improvement on their vocal delivery, such as voice pitch, pace, variability, pauses, and verbal distractors. The innovation was introduced to the students during the second week of the semester, and all students in the course were provided with access to the technology via a cloud-based subscription. The program can be used on any laptop, tablet, or mobile device, making it convenient for students to practice anytime and anywhere. The technology assists students in practicing presentations by providing 30+ self-paced video tutorials for students to view after reviewing and reflecting on the automated personalized feedback received after each presentation practice session (Makhiboroda, 2019).

Methodology

To test the effectiveness of the AI innovation, this study uses a within-subjects comparison of pre-test and post-test scores measuring student self-efficacy in giving sales presentations and self-efficacy in vocal delivery skills twice (Time 1 and Time 2). Additionally, we analyze the performance scores for vocal delivery skills pre- and post-innovation for Time 1 and Time 2 (H2 a-e). The following sections provide additional information regarding the study's methodology, including the sample statistics, measures, and analysis results.

Sample

The study was performed at a western university in the United States during a course designed to improve sales presentations and oral communication. The study participants included 82 undergraduate students (n = 82) enrolled in two sections of the online course. Demographic statistics of the sample are provided in Table 1.

Table 1: Statistics of the Sample Demographics (*n* = 82)

Gender	***Percentage***	***Total Number (N)***
Male	68	55
Female	32	27
Age		
18-24	54	45
25-34	37	30
35+	9	7
Race		
White	86	71
Black	5	4
Asian	5	4
American Indian	1	1
Other	2	2
Year in School		
Senior	76	62
Junior	18	15
Sophomore	6	5
Freshman	0	0

During the first week of the semester, all students were asked to complete a voluntary online survey using Qualtrics; extra credit was offered for completion. The presurvey was conducted during the first week before the innovation was provided to students. A post-test was given at the end of the semester after all assignments in the AI innovation were completed. The self-efficacy questionnaire during Time 1 (pre-test) and Time 2 (post-test) was provided and completed by all 82 students. In addition, Time 1 and Time 2 performance score data were captured by the AI technology for each of the measured vocal delivery skills shown in Table 3 below.

Measures

Preexisting measures were used for all constructs, and items were measured using a five-point Likert scale. The student's self-efficacy for presentations was measured using three items adapted from validated scales (Bandura, 1997; Spreitzer, 1995). In our study, the items created for measuring self-efficacy specifically related to the task performance, as we asked students to rate their self-efficacy in performing the task of delivering a sales presentation. For the self-efficacy items, item reliability was calculated using Cronbach's alpha, α =.87.The students' self-efficacy for vocal delivery skills in sales presentations was measured using six items adapted from Adams (2004). The item reliability for self-efficacy in vocal delivery items has a Cronbach's alpha of α = .86. Appendix A provides all of the items. In addition, demographic items were also included (i.e., age, gender, race, year in school.)

This research aimed to test whether the online classroom innovation using cloud-based AI and machine learning technology helped students improve their self-efficacy in sales presentations and vocal delivery skills. Additionally, mean vocal delivery skill scores were analyzed to evaluate student improvements on each vocal delivery skill.

Results

This analysis used JMP 14 in order to test the effectiveness of the online AI presentation coaching tool. We conducted a paired samples *t*-test to test the difference in the overall means for the dependent variables of online students' self-efficacy for Time 1 (pre-test) and Time 2 (post-test).

Prior to comparing the means of Time 1 and Time 2 for self-efficacy in giving sales presentations, we performed a Shapiro-Wilk Goodness of Fit test on the distribution of the difference in the two means, confirming a normal distribution of the difference in means ($W = 0.976$, $p < W = .130$). We subsequently performed a matched pairs *t*-test analysis on the student data for H_{1a}. (See Table 2.) The results indicate that there is a significant difference in the students' self-efficacy for presentations after they participate in the innovation with a *p*-value of 0.001 that is significant at the 0.5 level.

Table 2: Paired Samples *t*-Test Results for $H_{1a\text{-}b}$ ($n = 82$)

		Pre-Test Time 1		***Post Test Time 2***		***Paired Differences***			
		M	***SD***	***M***	***SD***	***Mean Difference***	***Std. Error***	***t***	***p***
1.	Self-Efficacy	3.15	.75	4.18	.59	1.028	.10	9.46	.0001*
2.	Vocal Delivery	3.12	.72	3.89	.64	.766	.09	7.95	.0001*
Note: Self-Efficacy items (α = .89) and Vocal Delivery items (α = .86). *$p < .05$									

H_{1a} stated that the students would improve in their self-efficacy for sales presentations by using the AI classroom innovation. Table 2 provides the analysis results for H_{1a}. The data supports H1a, indicating that there was a significant difference in the students' self-efficacy for giving a sales presentation after using the AI innovation.

Next, we tested $H_{1b,}$ which stated that students vocal delivery skills would improve by using the AI classroom intervention. We performed a Shapiro-Wilk Goodness of Fit test on the distribution of the difference in self-efficacy for vocal delivery skills at Time 1 and Time 2, observing a normal distribution of the difference of the means ($W = 0.980$, $p < W = .2449$). We then performed a matched pairs *t*-test analysis on the student data for $H_{1b.}$ The results indicate that there is a significant difference in the students' self-efficacy in vocal delivery skills, with a *p*-value of 0.001, which is significant at the 0.5 level This data supports H_{1b}, as there is a significant difference in students' self-efficacy in vocal delivery skills after using the AI innovation to practice sales presentations online (Table 2).

H2a-e hypothesizes improvement for each individual verbal delivery skills score measured (Table 3) using the AI technology to showcase the ability for the technology to capture each student's measurable progress. For this analysis, Time 1 was the student's first-use measurement using the AI technology, and Time 2 was the student's final use measurement using the AI technology. The AI technology provided data for each measured vocal skill. We then tested the scores using a matched pairs analysis for each of the measured vocal skills.

Table 3: Student AI Measured Vocal Delivery Skills for H2: a-e (*n* = 82)

		Pre-Test Time 1		Post Test Time 2		Paired Differences			
		M	**SD**	**M**	**SD**	**Mean Difference**	**Std. Error**	***t***	***p***
1.	Pitch Variability	12.35	.72	18.38	.64	6.02	.50	11.89	.0001*
2.	Pace	2.61	.81	3.71	.56	1.09	.09	11.21	.0001*
3.	Pace Variability	17.86	5.00	24.64	3.02	6.77	.56	12.09	.0001*
4.	Volume Variability	31.72	3.78	40.44	6.55	8.72	.70	12.33	.0001*
5.	Pauses	10.06	7.50	25.98	11.44	15.92	1.20	13.24	.0001*

The results indicate a significant difference in the students' pre-test and post-test scores for verbal delivery skills in presentations after they participated in the innovation with a *p*-value of 0.001, which is significant at the 0.5 level (Table 2). The significance is important, but it is also noteworthy that each skill (H2 a-e) significantly improved in the right direction by Time 2, all falling within the ideal performance score range, as measured by the AI innovation (Table 3). The following provides definitions and score parameters for each of the measured vocal scores (Makiborhoda, 2019).

Table 4: Definitions for AI Measured Vocal Skills

Pitch Variability	Defined as the percentage change in the student's voice frequency. It is important to be able to adjust tone of speech up and down where necessary to emphasize key points. The score is calculated using the average percentage change in pitch frequency over the course of a practice session. A pitch variability score over 16 is considered good.
Pace	Defined as the speed of the student's speech during the presentation. The technology calculates pace by tracking the average number of syllables per second over the course of the practice session. Anything below 2.6 is considered too slow; anything above 4.1 is considered too fast.
Pace Variability	Defined as the percentage of change in the speed/pace of speech. The technology calculates pace variability as the average percentage change in pace over the course of a practice session. A range between 2.6 and 4.1 syllables per second is ideal. Within that range, speakers have the ability to adjust pace to add variety, which is what pace variability measures. A pace variability score over 21 is good.
Volume Variability	Defined as the percentage change in the volume of one's speech. PitchVantage calculates volume variability as the average percentage change in volume throughout the practice session. A volume variability score over 35 is good.
Pauses	Defined as the portion of silence in a presentation. The technology calculates this portion as a percentage; 20 seconds of silence during an 80-second presentation would yield a pauses score of 25, referring to 25% of silence/pausing. A good pause score is between 13 and 35. A score above 35 means the student paused too much; a score below 13 means the student did not pause enough.

Discussion

The study results provide evidence that students' sales presentation self-efficacy can be improved using an online AI machine learning innovation. The results appear to be consistent with prior research that experiential learning-type activities used in sales curricula positively influence self-efficacy (Bandura, 1977, 1978, 1986; Knight et al., 2014). Using AI and machine learning can potentially be a viable option to increase skill, competence, and self-efficacy in sales presentations. This self-efficacy includes vocal delivery skills in presenting products and services, both for individuals and for larger audiences. We believe that the results of this study indicate that AI and machine learning innovations can help online students increase self-efficacy in sales presentation tasks. This study adds to the empirical research for sales education as increasing self-efficacy is highly associated with increased job performance (Barling and Beattie, 1983); meanwhile, this study contributes by researching the effectiveness of digital innovations that may be helpful in preparing students for future careers in professional sales (Cummins et al., 2013; Bolander et al., 2014; Crittenden et al., 2019; Deeter-Schmeltz, 2019). The study results also align with Peltier et al. (2005, 2006), who find that students benefit from learning techniques that allow them to reflect on and better understand their learning experiences during and after they occur. The students in our study received personalized feedback and coaching from PitchVantage after each sales presentation using a virtual audience. This personalized feedback helped the students reflect on and unpack their performances before future practices. This practice was consistent with prior research showing that students who improve their

communication skills are better prepared to conduct effective sales calls (Cost et al., 1992; Bristow et al., 2006).

Post-Hoc Analysis

We further conducted a post-hoc analysis on the data set to explore additional insights that were not hypothesized *a priori*. Using one-way analysis of the mean, pooled *t*, and Tukey's HSD, we found that the difference in the pre-test student means for presentation self-efficacy between the males and females differed significantly. For Time 1, the mean self-efficacy scores for the male group (M = 3.30, SD = .68) and females (M = 2.85, SD = .82,) were significantly different (p = 0.017, at p >.05, t = -2.62). These results suggest that in the beginning, the females were potentially less confident in their ability to perform a sales presentation than the males. However, at Time 2, the mean self-efficacy scores for the male group (M = 4.23, SD = .57) and female group (M = 4.08, SD = .65) were not significantly different (p = .31, p > .05, t = -1.02). These findings may suggest that there is no longer a confidence gap between the males and females post-intervention. Future research is needed to further explore the findings.

The findings could assist online instructors in exploring options to consider for use in the challenges presented by teaching sales presentations in the virtual online environment. AI may help students improve on tasks such as sales presentations, as it is challenging for instructors to provide an online environment conducive to improving self-efficacy in oral communication skills mainly due to the lack of face-to-face interactions and the difficulty of measuring students' practice sessions (Brookfield and Preskill, 2005). We found the AI machine learning innovation to be a great option, providing students a real-time audience for practicing, including an online presentation "coach" with integrated modules and personalized feedback.

Limitations and Future Research

As with any study, ours has limitations and constraints that exist in our methodology, sample size, and/or timing. First, our sample of sales education students was limited to students enrolled online. Though we feel confident that similar findings would be found in a face-to-face classroom, this was not the intent of our research. It may be beneficial to explore this question in future research. Second, sample or selection bias may be present within our findings as we conducted this study with students who self-selected into course sections. They were not randomly assigned to receive the innovation "treatment." Due to our limited access to the students, course requirements did not allow us to exclude students from the innovation during the semester. Though this may be a concern, all students received the innovation. We felt that the pre-test/post-test within-subjects design was a sound option for gaining exploratory insight into our research questions. Third, the student sample of 82 was reasonable. However, if we had the use of a larger sample size that allowed for a proper control group and, if possible, one not receiving the AI technology, we might have found stronger conclusions. Fourth, as with any university sales education course, the instructors were bound to a semester schedule. As a result, our study was conducted within a one-semester timeframe. There may be a need for a future longitudinal study to gain further empirical support and locate additional AI-related classroom benefits for sales education students. Finally, due to the exploratory nature of our study questions, future studies could help explore the amount of time spent, number of practice

sessions, or other variables that could impact students' improvement in self-efficacy and vocal skills for sales presentations.

Conclusion

This study provides insight into the effectiveness of using AI and machine learning to enhance sales presentation skills for online students in sales education. Exploring the effectiveness of innovations for students is critical, particularly given that online learning trends will continue into the foreseeable future (Croxton, 2014). There exist unique challenges to providing an environment for online sales education students seeking to develop their skills and overall self-efficacy for sales presentations. Because they lack classroom support for practice, students can benefit from technology that allows real-time interactions with a computerized audience through AI. Our study indicates favorable results for both overall self-efficacy and individual vocal delivery skills. These results can help educators continue to find ways to expand machine learning and AI to help boost sales student's confidence and self-efficacy, thus preparing them for sales presentations with clients and customers post-graduation.

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Appendix

Sales Presentation Self-Efficacy Items (Bandura, 1977; Spreitzer, 1995)

I am confident that…

1. I can give an engaging sales presentation.
2. I have the skills to give a sales presentation to a large audience.
3. I have the ability to present a successful persuasive presentation when required by my instructor or future employer.

Vocal Delivery in Sales Presentation Skills (Adams, 2004)

1. I use a lot of voice pitch variability when I give a presentation.
2. I can pace myself effectively when I give a presentation.
3. I use a lot of verbal distractors or filler words (ums, ahs, likes).
4. I know when to pause for emphasis in the presentation.
5. I give appropriate eye contact during a presentation, which gives the audience confidence.
6. The overall quality of my persuasive presentations is high.

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