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TEACHING TO LEARN: LEARNING OUTCOMES FOLLOWING A STUDENT DIRECTED VOCAL HEALTH EDUCATION PROGRAM

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TEACHING TO LEARN: LEARNING OUTCOMES FOLLOWING A STUDENT DIRECTED
VOCAL HEALTH EDUCATION PROGRAM

Hannah Sons

TEACHING TO LEARN: LEARNING OUTCOMES FOLLOWING A STUDENT DIRECTED
VOCAL HEALTH EDUCATION PROGRAM

Hannah Sons

An Independent Study Submitted in Partial Fulfillment of the Requirements

for the Degree of

MASTER OF SCIENCE

Department of Communication Sciences and Disorders

ILLINOIS STATE UNIVERSITY

Spring 2018

Student's Signature

Date

Director's Signature

Date

Second Reader's Signature

Date

Department Chairperson's Signature

Date

Statement of the Problem

The traditional model of learning within a collegiate setting has relied on lecture-based teaching (National Academy for Integration of Research. 2010). Specifically, for students at Illinois State University, those taking the undergraduate required course in introductory voice sciences and disorders are generally exposed to the inner workings and potential dysfunctions of the voice via this model. Furthermore, this course is the only voice-specific course within the undergraduate curriculum that sets the foundational knowledge of the voice for students pursuing the field of speech-language pathology. The course contains multimodal activities dispersed throughout the 16-week class to emphasize and augment concepts related to laryngeal anatomy, voice science, and voice disorders. Yet, the time available to educate students on advocating for and educating other students entering vocally intensive professions about vocal health is limited.

Previous literature has suggested that learning may be optimized and reinforced by problem-based (PBL) and student-led learning (SLL) activities. SLL is defined by Marvel, Simm, Schaaf, and Harper (2013) as, “students teaching to their peers, whilst their peers participate actively in the process” (p.548). Marvel et al. (2013) further report that this approach (i.e. shifting of roles between student and teacher) is significant because it gives the students control over their experience and their learning without feeling bound by a rigid curriculum. In fact, it is this freedom that intrinsically motivates the students to further research and explore ideas within their field (Marvel et al. 2013).

Although there is limited research available that analyzes student-led programs specifically pertaining to vocal health education, there are studies that illustrate the effects of vocal health programs and student-led teaching separately. A traditional focus of such research

has been on how or if vocal health education leads to the prevention of voice problems (Richter, Nusseck, Spahn, & Echternach. 2016). One study found that student teachers in Germany, who received a vocal health education over the course of a year and a half, were significantly less likely to experience negative voice changes and more likely to maintain a desirable and healthy voice quality compared to student teachers who were not exposed to the program. Due to the explicit education, instruction, and exercises that were received by the student voice users, they were less likely to be hindered by vocal health challenges that prevented them from fully engaging in their work (Richter et al., 2016). Thus, the evidence from this and other similar studies indicates that future and practicing teachers as well as other professional voice users can likely benefit from engaging in an educational vocal health program.

While many researchers have explored how general education programs and those related to vocal health have facilitated learning and behavior, other researchers have explored SLL and how it benefits learning. Marvell, Simm, Schaaf and Harper (2013) specifically studied college students in their senior year who participated in an international field trip. The field trip required the geography students to identify a research topic prior to the trip, further refine the topic once on the trip, and formulate a peer-audience activity based on their research. In order to support students prior to the trip, students attended lectures and workshops specific to the geographical location of their trip. Based on themes identified in pre-trip student reflections, module evaluations, and fieldwork activities led by the student presenters, significant learning was evidenced. In particular, qualitative analysis of the post-questionnaires and reflective journals revealed that students valued the contextualized setting in which their learning occurred as well as emphasis on the perspective change that resulted from stepping into a teaching role. The perspective change and positive outcomes of Marvel, Simm, Schaaf, and Harper's (2013) study

indicated that SLL might similarly benefit students pursuing other fields such as speech-language pathology; furthermore, the previous study indicated substantial evidence for educational outcomes that benefit students who are active participants in their learning and for audience members who may be the recipients of student-led programming. The qualitative analysis by Marvel et al. (2013) indicated the audience's preference for learning from same-aged peers due to their language and approach used to convey information. Thus, the positive outcomes evidenced in these studies that analyzed both participant and audience perspectives, suggest that a vocal health education program led by students might produce similar positive outcomes not only by facilitating vocally healthy behavior in audience members, but positive outcomes in student learning as well.

Problem-based learning (PBL), according to the National Academy for Integration of Research (2016), is defined as “a student-centered approach to learning in which student knowledge is developed during the process of studying problems or real-life scenarios” (p.179). This approach allows students to identify and analyze pertinent information within a scenario or context that they may encounter as future professionals. PBL bridges over into SLL as it can be the vehicle by which students lead not only their own learning, but the learning of others as well.

The current study was conducted to identify the outcomes of CSD student's learning by engaging in problem-based learning (PBL) and student-led learning (SLL). Specifically, students developed and facilitated a vocal health education program for an audience of peers studying to be professional voice users. Audience members included students majoring in education, theater, radio, television, film, communication, vocal music, or other vocally intensive fields.

The “problem” CSD students were to address throughout this experience was how to best instruct students studying vocally-intensive professions about complex anatomy and physiology and voice disorders. Engaging with this problem should have motivated the CSD students (i.e., investing ownership) to engage fully in the process of creating a vocal health presentation that might potentially help their audience members prevent or manage voice problems in their future careers. In turn, CSD students were developing their ability to clearly and thoughtfully educate others about vocal health and prevention of a disorder—a necessary skill for future speech-language pathologists.

Therefore, PBL and SLL are integral and reciprocal. Specifically, when students are faced with real-life contextual problems (i.e. PBL) that require them to lead their own learning and that of others, they are likely to be intrinsically motivated to take greater responsibility for their learning (Charlin, Mann & Hansen., 1998). The entire process is likely to lead to meaningful, active learning experiences for those students engaged in PBL and SLL combined. In order to investigate the effects of the combined SLL and PBL approach on CSD students’ learning, the following research questions were the focus of this research:

1. How does CSD students’ knowledge change about vocal health, vocal anatomy and physiology, voice disorders, and occupational voice users from before designing this experience to after its preparation and, finally, to after its dissemination?
2. What insights do CSD students develop about their own learning from engaging in this experience?

Review of the Literature

Overview

Limited research exists regarding how CSD students' learning is positively shaped by PBL and SLL. The act of preparing and presenting vocal health education program for peers is one way to incorporate both PBL and SLL into a real-life educational experience. PBL is a learning approach that presents students with a real-world problem that is particularly meaningful to them. (Charlin, Mann & Hansen., 1998). SLL is a learning approach that transforms the role of the student into the facilitator of learning (Marvel, Simm, Schaaf, & Harper., 2013). Thus, the use of SLL involves students taking ownership of what and how they learn. Research has indicated that both SLL and PBL facilitate students' active engagement in the learning process, better fulfill learning outcomes from peer-to-peer instruction, and facilitate the ability to apply knowledge to real world situations (Marvel, Simm, Schaaf, & Harper, 2013, Morrison., 2004., National Academy for Integration of Research., 2010., Charlin, Mann & Hansen., 1998).

The preparation and facilitation of a vocal health program should incorporate both approaches to learning. In particular, when instructors and/or facilitators ask students to determine the best way to present and integrate complex vocal health information into a presentation for their peers, students are faced with a problem with intrinsic value and meaning; henceforth, PBL takes place. Further, when instructors and/or facilitators give CSD students the responsibility of developing and presenting the program, SLL takes place and students are afforded the opportunity to participate in an authentic experience to develop and apply skills. These skills such as vocal health education and counseling are skills that they will utilize as professional speech-language pathologists.

Problem-Based Learning.

Recent research has examined the implementation and benefits of PBL and SLL particularly within higher education at the undergraduate and graduate levels. In relation to PBL, Lundenberg, Levin, & Harrington (1999) indicate that “theoretical or principled (i.e. formal) knowledge is an essential component of education” (p.23), but that authentic scenarios are the vehicle in which student learning and application of knowledge is furthered. Because PBL challenges students to identify, dissect, and address a problem within a context that is most meaningful to the student (i.e. future profession), this approach integrates theory and real-world practice rather than treating them as two separate processes.

Akay (2017) further indicates that PBL encourages students to take further interest and responsibility for their own learning. Specifically, this approach requires students to learn information and apply it within real-life scenarios, rather than passively taking it in a traditional decontextualized or theoretical way. An example of this learning provided by Ackay (2017) is a biology course that required students to formulate questions (i.e. particularly meaningful to them) based on reports within the local and national news. They were then asked to apply their knowledge from class to answering these questions as well as identify additional topics and issues socially related to technology and science. Overall, the students’ experience involved the creation of an interactive solution to address the issues and questions they identified (e.g. local river cleanup and water quality; Ackay, 2017). The researcher indicated that this format facilitated peer interactions and community involvement. Thus, the learning outcomes would be highly applicable and pertinent to the students both personally and professionally in the future. This experience was also something that could not be conveyed within a traditional science

textbook. Students were stakeholders within this course because it related to the community that they lived in.

PBL Curriculum in Communication Sciences and Disorders. PBL may also be incorporated into the education of CSD students at both the undergraduate and graduate levels. For example, the National Academy for Integration of Research, Teaching and Learning (2010) studied undergraduate first, second, and third year CSD students whose curriculum integrated PBL. Although students did not engage directly with a client, the curriculum included PBL modules that posed weekly case questions to students. Each clinical case included a fictional client with more than one potential speech, language, or swallowing condition (e.g. an aphasia patient with dementia). Subsequent lectures and workshops related and focused on the problem (e.g. how to approach treatment with comorbidities) while simultaneously providing the foundational knowledge necessary to address the problem posed (e.g. defining the characteristics and manifestations of each comorbidity). Following this semester-long experience, impact on student learning was explored via qualitative analysis of students' reflection journals. Students responded to analysis questions such as the following via their journals: "To what degree have you been able to facilitate learning by integrating knowledge and skills from different sources – tutorials, readings, internal and external lectures, discussions with colleagues, your own experience?" (National Academy for Integration of Research., p. 182., 2010). Findings indicated that first year students found PBL and past experiences more facilitative of their learning compared to traditional lecturing methods throughout this experience. Second and third year students indicated that lecture, readings, and self-directed research and completion of PBL modules were most facilitative to their learning. Furthermore, third year students discussed the additional significant role the beginning clinical experiences played, as these experiences

combined with the PBL modules allowed them to make authentic connections between the cases and real world clinical scenarios. This study is particularly important, as its findings outlined the value of PBL to students taking on their future professional roles.

Student-Led Learning. SLL may facilitate PBL because it requires students to lead theirs or others' learning when grappling with questions and scenarios. For example, Marvell et al. (2013) outlined the functionality of an SLL approach during a field trip within the context of a college course. Findings indicated student learning was significant due to the students taking on the role of facilitator and teacher. For example, students were required to formulate and lead group presentations based on their fieldwork, as well as incorporate an activity to check the student audience for learning. Other studies in which SLL was the primary approach to instruction noted enhanced students learning outcomes, student professional skill development, and increased self-awareness skills (Brown, Collins & Gratton., 2016; Pittaway, Gazzard, Shore, Williamson., 2015). It is evident this approach was appropriate across disciplines and across settings, as all of the findings indicated development of necessary skills for future practice. Furthermore, this evidence indicated that CSD students who engaged in SLL and PBL (i.e. by conceiving, facilitating, and implementing a vocal health education program) would likely experience learning benefits that may be more significant than traditional educational methods (i.e. lecture, in-class discussion).

As described above, there are numerous benefits to PBL and SLL; however, it is equally important to consider the populations in which the real-life and authentic problems can arise and subsequently be addressed by students engaging in PBL and SLL. The subsequent sections will discuss the prevalence of voice disorders within various populations as well as currently available vocal health programs that have benefitted these populations.

Prevalence of Voice Disorders

Voice disorders are primarily patient-defined. For example, the patient typically determines whether or not he or she has a voice disorder based on how or if his or her voice compromises their quality of life regardless of the condition of their larynx. Other factors that may contribute to the development of a voice disorder include gender, age, and occupation. For example, older individuals, adult women, and professional voice users (those who use their voice frequently for their profession) are all more predisposed to voice problems (VanHoutte et al. 2009, Latham et al. 2017, Stemple et al. 2014). While it is difficult to acquire accurate representational statistics regarding the prevalence of voice disorders within particular populations (Stemple, Roy & Klaben, 2014), several studies have identified specific professional voice user populations in which voice disorders are especially prevalent.

Teachers. Smith, Lemke, Taylor, Kirchner and Hoffman (1998) conducted a survey study to examine the frequency of reported vocal problems in teachers as compared to non-teachers. The researchers report, “thirty-eight percent of the 558 teachers surveyed felt their voice was negatively impacted because of teaching” (p. 483). In fact, 32% of these teachers indicated suffering from a voice problem versus only 1% of non-teachers; moreover, 77% of teachers who experienced a voice problem reported that it was continuous or chronic. Despite these findings, 14% of those teachers who believed they were currently suffering from a voice problem indicated they were unlikely to seek medical help for it.

These findings could indicate that teachers may have difficulty taking action to combat their vocal problems because of fear of job loss, inability to take time off, or other economic costs (Cohen, Kim, Roy, Asche, & Courey., 2012; Roy, Merrill, Thiebeault, Gray & Smith.,

2004). Additionally, the results of the survey may suggest that teachers with voice problems are unsure of how to seek medical help. The findings of Smith et al. (1998) clearly indicate that teachers are more likely to develop voice disorders than individuals with less vocally-intensive occupations; moreover, the study makes obvious the urgent need for vocal health education to encourage help-seeking practices when both teachers and non-teachers experience voice problems. Another vocally-intensive profession that could potentially benefit from vocal health education is performers.

Performers. Like teachers, singers and actors are amongst the various populations of professional voice users dependent on their voice to make a living and at risk for voice disorders. Even individuals who perform, but not professionally may be at risk for developing voice problems over and above non-performers. For example, over half of 192 adolescent singers surveyed about their voices reported a significant amount of voice challenges, perhaps because of little vocal training and experience (Sataloff, Reilly, Lawless, Sampson, Deutsch, & Tepe., 2002).

Vocal Health Programs. In a study conducted by Van Houtte et al, (2009), researchers identified the most prevalent types of voice disorders across age, gender, and occupation. Their findings not only identified the populations previously discussed as sufferers from preventable disorders (i.e. functional dysphonia), but they also emphasized a crucial need for education that might prevent the onset of a voice disorder. Their findings provided support for the necessity of vocal health programs not only for current professional voice users, but future professional voice users.

Latham, Messing, Bidlack, Merritt, Zhou, and Akst (2017) conducted an online survey of graduate schools with music programs to identify the way in which vocal health and physiology education were provided to university music students. Specific areas of focus included exploring the amount of vocal health instruction, determining the source of instruction, and determining if music schools had connections with medical professionals who could address voice disorders (Latham et al., 2017). Ninety-five percent of music schools surveyed provided instruction on vocal health to graduate singing programs; however, 55% of the schools admitted this instruction was not from a medical professional. Factors such as poor funding and limited access to medical professionals who assess, treat, and provide preventative education on voice disorders and vocal health were cited as barriers to such specialized instruction.

Latham et al. (2017) study suggests that vocal health programs led by students studying speech-language pathology or medicine might be a cheaper alternative to bringing in individuals who were already working in these fields. Further, students studying disciplines in which the prevalence of vocal disorder is higher might derive greater benefit from education coming from their peers. Specifically, benefits such as increased confidence and increased knowledge were found when experienced peer nurses practicing in specialty areas were the main source of instruction that provided continuing education to novice nurses (Homan & Chichester, 2016). The primary reason for this response was due to information coming from a source that was nonthreatening and a source that have a level of understanding stemming from current practice (Homan & Chichester., 2016).

Scope of Practice. An SLP's scope of practice has historically included the identification, treatment, and prevention of voice disorders in addition to maintenance of a healthy voice (ASHA, 2005). As part of their academic training, students pursuing speech-

language pathology are required to take one voice course at the graduate level. To prepare students for not only graduate course-work, but future clinical practice as well, some institutions, such as Illinois State University, have required undergraduate voice coursework. These courses are critical to clinical practice, as they are the primary means of exposing students to the identification, treatment, and prevention of voice disorders, and the main forum in which students are educated on the intricacies of vocal health and treatment. Thus, because a solid educational foundation regarding the assessment and treatment of voice disorders is required and integral to future SLP's scope of practice (ASHA, 2005), a CSD student-led vocal health education program designed for a peer audience studying vocally intensive disciplines may be in the best interest of a student audience and student facilitators. Further, as previously noted, such a program relies on both PBL and SLL, which may facilitate learning to a greater degree than traditional teaching and learning methods alone.

Purpose. This study was funded by a Scholarship of Teaching and Learning Grant through the Cross Endowed Chair in the Scholarship of Teaching and Learning at Illinois State University. The study funded by this grant was approved by Illinois State's Internal Review Board. The purpose of this study was to determine the learning outcomes of undergraduate CSD students who created and facilitated a vocal health education program for undergraduate audience members studying vocal-intensive disciplines. This study examined the learning outcomes of the student audience members as well. This experience was intended to cultivate cross-disciplinary dialogue and foundational knowledge related to the voice and vocal health not only for CSD student participants, but also audience members.

Methods

Participants

Participant group 1. Study participants included twelve undergraduate students at Illinois State University (ISU) in the Department of Communication Sciences and Disorders (CSD). All participants were junior and senior-level undergraduates taking a 300-level course titled *The Voice and Its Disorders* (TVD) in the Spring 2017 semester.

Students were recruited to participate in this additional interdisciplinary and experiential learning opportunity from the Spring TVD course roster at the end of the Fall 2017 semester. Specifically, an email message was sent to explain that students would use TVD content to engage in semester-long preparation of a program on vocal health and disorders, called “*Inside Your Voice* (IYV).” IYV would be disseminated to other undergraduate students studying vocally-intensive disciplines at the end of the Spring 2017 semester. The first 14 TVD students who indicated a desire and commitment to participate in this supplementary experience for honors or independent study credit were enrolled.

Participant group 2. Another group of participants were those that eventually viewed the presentation executed by TVD students in April 2017. Audience members (n=16) included undergraduates studying vocally-intensive disciplines such as theater, vocal performance, broadcasting, business, teaching and CSD. Audience members studying CSD were invited to attend IYV if they had not yet taken TVD.

Attendees were initially recruited through professors in their own disciplines. First, the investigators contacted a variety of theater, vocal performance, teacher education, CSD, business

and broadcasting professors. The professors were asked to provide information about IYV via electronic announcements to their class lists, or by allowing the investigators to make in-person announcements during class meetings. Other attendees were recruited via social media announcements. All interested students contacted the principal investigators to indicate their major, how they heard about the event, and intention of attending the event.

Procedures

First meeting. CSD group 1 participants gathered for a meeting with the TVD instructor and graduate assistant (co-investigator of the associated research) weekly during the Spring 2017 semester. During the first meeting, CSD participants signed a consent form indicating approval for the investigators to analyze and report data collected through the course of the semester. The instructor and graduate assistant also outlined the expectations and format of the weekly meetings and the general structure of the culminating presentation. Students also chose partners and a topic that they would be responsible for preparing to present during IYV. Specifically, two participants each worked on creating ten minutes of content for the topics of anatomy and physiology, vocal health, voice assessment, and voice treatment, respectively; while three participants each worked on preparing ten minutes of content for voice disorders and seeking help for voice disorders sub-sections of the presentation. Students were not assigned partners or a particular topic, but chose them freely amongst themselves.

Prior to the start of this experience, CSD students completed a pre-experience true-false assessment containing 15 questions (see Appendix A) and five open-ended pre-experience reflection questions (see Appendix B) regarding their beliefs and current knowledge of vocal health and disorders and their career and learning goals, etc. Both questionnaires were used to

characterize students' baseline knowledge, perspectives, and beliefs in relationship to voice anatomy and physiology, vocal behaviors, voice disorders, and vocal health.

Discussion-based meetings. Due to conflicting schedules, CSD group 1 participants met as two separate cohorts across the semester: One group of six met on Thursdays and another group of eight students met on Fridays, both for 12 weeks. After the first meeting, students' first seven weeks of the semester were focused on discussing a new vocal health topic under the guidance of the graduate assistant facilitator and co-investigator. Prior to each meeting, students were responsible for reading assigned literature and composing discussion questions to share with other CSD students. Assigned readings included research articles, chapters from various books focused on voice disorders and vocal health, and links to online materials including informational websites from clinical voice organizations and videos of laryngeal exams.

Each meeting began with discussion of the questions students brought with them, based on their reading. Students were first encouraged to answer each other's questions. If posed questions could not be answered, students were provided with more information and encouraged to engage in further collaborative discussion. Meeting summary notes were compiled by the graduate assistant and were posted in a shared forum for students to access after the meeting. As a result, students focused on the content of the topic, rather than note-taking.

Presentation-focused meetings. Each group of students was required to navigate complex scientific information related to their specific topic of anatomy and physiology, vocal health, voice disorders, seeking help, assessment and treatment, presented to them through their TVD course, and during their small-group discussion meetings throughout the semester. Their objective was to use their experience inside and outside of the classroom as well as this

independent study experience to create presentation content. Content for the presentation included visuals, demonstrations, handouts, and written bullet point in Powerpoint explanations, all of which were relatable to audience members and easy to understand.

Students composed their section of IYV material on a shared Powerpoint presentation forum that was available from the beginning of the experience. Students added content appropriate to their general topic throughout the seven weeks of discussion as well as provided comments to other teams to provide guidance and support. The co-investigators also provided additional comments and support. During three of the last four weekly meetings, students focused on refining the IYV content that they had created. They practiced its timing and delivery, and resolved any lingering questions about concepts and event logistics. The co-investigators (instructor and graduate assistant) as well as students from other groups, provided participants with suggestions focused on the best way to deliver content and visuals/information to add or omit during their practice time.

Inside your voice. During the 13th week of the semester, the vocal health education program, Inside Your Voice (IYV), was delivered via CSD students to undergraduate attendees described earlier. Audience members provided informed consent before the initiation of the program. Student audience members were also asked to fill out a pre-program true false assessment (see Appendix C), a demographics form (Appendix D) and 8 preprogram open-ended reflection questions (Appendix E). Questionnaires were used to acquire information about audience members' baseline knowledge regarding the six main presentation topics and also provided a platform for audience members to share their personal and professional vocal experiences and knowledge. Specifically, following the written completion of open-ended and

true-false questions, a 15-minute group discussion between various majors attending the event and between student presenters took place.

Once the group discussions concluded, the student-led presentation began. Each group of students presented respective topics to peer audience members using interactive exercises such as explaining and asking questions about videos of the vocal folds. The presentation followed this topical sequence: anatomy and physiology, vocal health, voice disorders, seeking help, and assessment and treatment. After information on each topic was presented, an opportunity was provided for each group of student presenters to ask the audience questions and vice versa.

After the final section of the presentation, audience members were asked to complete the same true-false questions that they had completed pre-program (see Appendix C). Students also completed 10 post-program open-ended reflection questions (see Appendix F). Both questionnaires were used to examine changes in baseline knowledge and perspectives on vocal health from before to after the presentation.

Last Meeting. A week after the event occurred, CSD student participants returned for a final meeting to share thoughts, reflections, and suggestions about the event and their experience as presenters and teachers. Following this final meeting, student presenters completed the same 15 true-false questions originally answered pre-experience, as well as ten post-experience open-ended reflection questions (see Appendix G).

Data Analysis

For the purposes of this project, only data from group 1 participants were analyzed using qualitative (e.g., content analysis) and quantitative (e.g., measures of central tendency) means. Specifically, CSD students' pre-, post-, and interim true-false assessments were statistically

analyzed to examine knowledge gains across time. Due to the small sample, a non-parametric Friedman test was used. Alpha was set at .05.

Likewise, pre- and post- qualitative questions were coded for themes and changes in perspectives prior to and following this semester-long experience. Data were collected and qualitatively analyzed from group 1 participant pre-reflection questions (Appendix B) and post-reflection questions (Appendix G) using a modified version of Fink's taxonomy to code participant responses (Table 4). The primary instructor and graduate student each coded two participants individually according to Fink's taxonomy (caring, learning how to learn, foundational knowledge, application, integration, and human dimensions) and then compared their results together to establish inter-rater agreement.

During the review of coding results, the authors determined that the original taxonomy needed to be modified in order for the codes to be more comprehensive and representative of the data. As a result, coding definitions were modified collaboratively and applied resulting in a division of codes; one set for pre-experience responses and one set for post-experience responses. An explanation and example of the coding schemes used for both pre and post data can be found in Table 4.

Chapter 4: Results

Quantitative Analysis

Data for group 1 participants (i.e. CSD students) were statistically analyzed. The pre-experience true/false questions and the post-experience true/false questions were the primary source of data for this analysis. A Friedman test was run to determine if there were differences in performance across pre, interim, and post-experience true-false assessment. Assessments were significantly different across time points, $\chi^2(2) = 17.684, p < .0005$. Pairwise comparisons were performed with a Bonferroni correction for multiple comparisons. Test performance was significantly different between pre (Mdn = 73%) and interim-assessment (Mdn = 90%) ($p = .001$) and pre (Mdn = 73%) and post-assessment (Mdn = 90%) ($p=.013$). No significant differences were found between post and interim assessment ($p=1.00$). Table 1 outlines three specific questions in which students demonstrated varying amounts of growth and/or regression of concepts targeted in the pre-and post-assessment.

Qualitative Analysis

To examine the change across time in student responses, codes were compiled into two tables (see Table 2 and Table 3), one for pre-data and one for post-data. Participant totals for each code were calculated and then compared to determine changes in the features of student learning. Caring (C) was coded most frequently pre-experience while Human Dimension (HD) was coded most frequently post-experience. Overall, there was a noticeable increase in the number of responses for each of the five codes except Foundational Knowledge (FK) from pre to post-experience. The largest increase from pre to post-experience occurred in the HD code.

Chapter 5: Discussion

The purpose of this study was to investigate the effects of PBL and SLL on the learning outcomes of CSD students. Specifically, this study aimed to identify the change in student knowledge of the voice and vocal health and evaluate CSD student insights that were developed as a result of the learning experience. Based on the results from the pre-and post-questionnaires that focused on the voice and vocal health, the methods used in this study appear to have facilitated a gain in student knowledge from pre- to interim/post experience. Additionally, qualitative results indicate that the methods used in this study facilitated a shift in the student perspective.

An example of the perspective shift in the students is illustrated in one participant's response:

Pre experience. I don't know too much about the needs of each of these unique professions, but I do know that left untreated or unrecognized, many problems can occur. As a future CSD professional, I realize that I will also be using my voice frequently.

The response demonstrates the student recognizing the lack of knowledge within themselves when approaching the experience. The post experience response demonstrates a shift in the student from focusing internally (i.e personal lack of knowledge) to focusing externally (i.e how to help the client/profession).

Post experience. I honestly believe that being a part of this experience with help me both in my role as a graduate student and as a future professional. I was in charge of helping to come up with program that can relate to other professions, not just expressing concepts that I already know. This experience helped me realize that I may need to

phrase things differently so that others will understand (like future clients) and it also helped me to understand the importance of vocal health in certain professions (like teachers). This program gave me tools that I can use in the future when I work in a school.

These findings are supported through the research studies that investigated the impact of PBL and SLL on student learning outcomes (Riedel, Fitzgerald, and Leven, 2003., Pittaway, Gazzard, Shore, & Williamson, 2015, Ackay, 2017).

Quantitative Outcomes. The results of the quantitative analysis revealed overall there was knowledge gain from pre to interim, but not interim to post. Additionally, there were three distinct trends that were revealed across responses. The questions outlined in Table 1 demonstrate the three trends across all questions: back tracking, slight increased accuracy, and significant increased accuracy.

First, there was a noticeable trend from pre-experience to interim-experience as there was a 41% percent increase in correct responses. This may be attributed to the overlap of instruction from weekly discussion meetings and TVD class instruction. Similar outcomes were discussed in the Marvell et al. 2013 study in which students participated in workshops and guided instruction prior to the field trip experience and, as a result, increased their overall learning. Although there was a 41% increase from pre- to interim responses, there was also a 42% drop in correct responses from interim to post-experience questions. This may evidence the students' continuous processing and synthesizing of new and old information and, as a result, decrease the accuracy of their responses. For example, the students may have been synthesizing their old knowledge of vocal anatomy at the same time as processing the new knowledge of how the vocal

anatomy is used with a specific population. This continuous cycle of managing incoming information could have had an impact on the way in which the students answered the questions at varying periods of time.

Second, there was a slight increased accuracy in responses from pre-experience to post-experience overall in question three. The 8% increase overall, with no evident change from pre-to post experience, may support the idea of “learning as you go” described in Pittaway et al (2015). Pittaway et al. assert that students learn through actions of an experience that relate to practice as well as learning when applying knowledge accumulated over time from previous experiences. Moreover, the knowledge that is gained and applied leads to “a gradual process of knowledge accumulation” (Pittaway et al., 2015) which can be seen in the results of the quantitative analysis of this study. The students may have relied on their own information prior to the experience as well as the information from prior instruction to the experience, and applied it during the culmination of the experience.

Third, there was increased accuracy in student responses evidenced by increases not only from pre-to post-experience, but increases from all three moments in time (i.e pre, interim, post). From pre-to-post-experience there was an overall 67% increase in correct responses, from pre-to interim there was a 59% increase, and from interim to post, there was an 8% percent increase. This could indicate students had limited prior knowledge or instruction on the specific content of this question and as they progressed through the experience, relied upon the framework of PBL and SLL thus improving their overall outcomes. For example, question five asks about content specific to treatment of the voice. In the TVD course and in the IYV weekly meetings, treatment is not discussed early on. Rather, TVD discusses treatment primarily at the tail end of the course and the IYV weekly meetings discussed treatment options for voice disorders around the middle

of the experience. The 59% increase exemplifies this growth as students were instructed to read, research, question this area of content within the meeting and then process and compile this information into audience-friendly language. The further 8% increase suggests that learning was still improving from the time of the IYV event preparation until the dissemination of the IYV as students were the ones leading the audience in such exercises described in question five. The overall 23% median growth across all pre-interim-post experience questions provides evidence for positive outcomes as a result of PBL and SLL.

Qualitative Analysis. This study aimed to explore the insights of CSD students prior to and at the culmination of this experience; therefore, the coding scheme was adjusted as such to reflect the insights described by the students. Prior to the start of the experience, most students offered insights that fell within the Caring (C) domain. This indicates that most students placed value upon this experience and were invested in their learning, which according to Ackay (2016), is a primary key to successful SLL. The next highest number of responses fell within the Learning How to Learn (LHL) domain. This indicates that students were identifying areas of learning deficit and personal goals they wished to get achieve from the experience. The identification of these areas on the part of the students plays a role in the investment of the “problem” for PBL as it contextualizes the problem for the students and creates a framework in which the students are free to explore workable solutions without the restraints of a predetermined curriculum (National Academy for Integration of Research, 2016).

The post experience coding revealed a change in the students’ insights as Human Dimension (HD) was the domain most prevalent in student responses rather than Caring (C). The shift from students identifying their feelings and values prior to the experience to students learning about themselves and other and describing those changes post experience is evidence of

PBL and SLL. PBL and SLL, at their core, are approaches that specifically focus on the quality of the learning experience from the perspective of the learner (i.e. the student). This shift exemplifies a different quality of learning than the traditional dichotomous learning framework because the experience placed the student in a different role with ample freedom. In fact, the number of Application (A) responses nearly doubled from pre experience to post experience (see Table 2), which can be attributed to the new student role and new freedom resulting from the PBL and SLL framework of the experience.

Confounds. Prior to the formation of the IYV experience, CSD students were recruited on the basis of interest rather than completed coursework. While learning outcomes that were achieved and described above may have come from the experience, it is noteworthy that majority of the CSD students were enrolled in the TVD course throughout the experience. Thus, learning as a result of the experience, as a result of TVD, or as a result of both is unknown and may have also influenced the learning outcomes of the study. Additionally, it is unknown whether or not changes would occur between those who had already taken TVD versus students had not yet taken the course.

course.

Quantitative measure confounds include a small sample size. In terms of qualitative questions, questions posed in the beginning of the experience were different than the questions posed at the end of the experience and, some participants provided lengthier responses to qualitative questions than others which may have skewed qualitative counts.

Future Directions. The initial intent of this study was to not only examine the outcomes of the CSD student participants, but the audience member participants as well. Due to

incomplete data collected from the questionnaires the night of the IYV, the learning outcomes of audience members could not be examined. A follow-up study that focuses on the learning outcomes of audience members, specifically those on the receiving end of a student-led program, should be conducted. The study should also contain a larger sample for both student instructors and audience members in order for numbers to be more significant.

This study recruited and advertised for the IYV event to students across vocally intensive majors at Illinois State University. If a similar study were to be conducted, learning outcomes may change if the primary researchers conducted the IYV material as part of a course as a way to procure complete audience data. Moreover, presenting IYV material to a more homogeneous audience (i.e. members in the same major) may also have an impact on learning outcomes because it could lead to a greater understanding of a specific population's needs in relation to the voice and vocal health. While there is ample research available that outlines and describes PBL and SLL as individual learning approaches, there is research needed that focuses on the two learning approaches implemented together. Moreover, there is research needed with the two approaches with the focus of vocal health and voice disorder prevention in at risk populations.

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Table 1. Average percent correct for pre-experience, interim-experience, and post-experience answers across group 1 participants (CSD students).

Question	Average percent correct (pre)	Average percent correct (interim)	Average percent correct (post)
1. Professional voice users earn living with their voice	83%	100%	100%
2. Actors most at risk for voice disorders	83%	92%	92%
3. Medical management of voice problem is best given by PCP	92%	92%	100%
4. Poor water intake leads to voice disorders even more than technique use	42%	83%	41%
5. Muscles of the larynx can strengthen with exercise	8%	67%	75%
6. Lesions on the vocal folds almost always requires surgical removal	58%	92%	100%
7. Students studying to be teachers have vocal health info incorporated into their programs	100%	100%	100%
8. Professional voice users frequently seek out help for voice disorders	83%	92%	100%
9. The modal vocal register is used most often during singing	8%	67%	67%
10. Greater subglottic pressure is necessary to	83%	100%	92%

produce a lower pitched
voice

11. All singers are at the same risk for voice disorder regardless of genre	83%	83%	67%
12. The three subsystems of voice are respiration, phonation, and resonance	92%	100%	92%
13. Clavicular breathing pattern supporting phonation	92%	100%	100%
14. Voice assessment involves listening to the voice for irregularities only	92%	100%	100%
15. SLPs are the only professionals that can differentially dx a voice disorder	8%	92%	100%

Table 2. Number of coded statements per group 1 participant collected from the pre-experience questionnaire.

Question Categories-Pre	Pre-Foundational Knowledge (FK)	Pre-Application (A)	Pre-Caring (C)	Pre-Human Dimension (HD)	Pre-Learning How to Learn (LHL)
Participant 123	5	8	13	4	5
Participant 124	3	2	6	1	5
Participants 125	5	5	12	3	11
Participant 126	4	3	8	3	4
Participant 127	3	3	3	2	3
Participant 128	1	4	10	3	7
Participant 129	1	3	4	2	8
Participant 130	1	1	3	0	2
Participant 131	5	8	15	4	4
Participant 133	4	1	7	1	4
Participant 134	3	0	7	2	4
Participant 135	2	0	8	1	1
Participant 136	2	4	8	3	7
Participants Total	39	42	104	29	65

Table 3. Number of coded statements per group 1 participant collected from the post-experience questionnaire.

Question Categories- Post	Post- Foundational Knowledge (FK)	Post- Application (A)	Post- Caring (C)	Post-Human Dimension (HD)	Post- Learning How to Learn (LHL)
Participant 123	3	13	13	16	0
Participant 124	0	7	7	8	3
Participant 125	2	12	13	15	4
Participant 126	4	4	15	13	10
Participant 127	1	6	8	27	9
Participant 128	0	2	9	12	3
Participant 129	0	7	6	15	6
Participant 130	0	4	0	10	4
Participant 131	1	11	25	25	9
Participant 133	0	5	6	15	5
Participant 134	0	7	9	15	9
Participant 135	0	4	14	11	9
Participant 136	0	6	3	17	9
Participants Total	11	88	128	199	80

Table 4. Fink's modified taxonomy used to code pre-and-post responses of group 1 participants for qualitative analysis.

	Sample Coding Scheme	Transcript Code	Description/Example
1	Pre-Foundational Knowledge	Pre-FK	Understanding and remembering information and ideas related to present knowledge (<i>e.g. Singers, actors, and teachers all use their voices frequently, which can cause issues with vocal health</i>)
	Post-Foundational Knowledge	Post-FK	Understanding and remembering information and ideas related to present knowledge after the core applied experience. (<i>e.g. I knew teaching was difficult</i>)
2	Pre-Application	Pre-A	Taking skills, life experiences, and learning experiences, and thinking critically, and practically, about prior knowledge to interpret information or ideas (<i>e.g. These professions use their voice more strenuously than the average person and therefore need to know how to use it correctly</i>)
	Post-Application	Post-A	Taking skills, life experiences, and learning experiences, and thinking critically, and practically, about experiential knowledge to interpret information or ideas. (<i>e.g. I definitely see the benefit of more hands on learning and the difference between collaborative learning in a small setting versus a lecture in a large class</i>)
3	Pre-Human Dimension	Pre-HD	Recognizing qualities in oneself and others (<i>e.g. In order to maintain my own vocal health and assist my future clients in the best way possible it is important for me to develop a deeper understanding of the voice and how to prevent voice issues</i>)
	Post-Human Dimension	Post-HD	Learning about oneself and others as a result of core experience (<i>e.g. It really taught me how to make sure other people understand the information</i>)
4	Pre-Caring	Pre-C	Identifying pre-existing feelings, interests, and values (<i>e.g. I am hoping I am able to become confident</i>)

			<i>enough to pass along this information with friends and family who may suffer from voice disorders.</i>
	Post-Caring	Post-C	Developing new feelings, interests, and values as a result of core experience (<i>e.g. I felt more confident and comfortable with the material</i>)
5	Pre-Learning How to Learn	Pre-LHL	Identifying knowledge deficits and learning goals to become a more self-directed learner (<i>e.g. I'm curious about the differences between each of the professions and their vocal demands</i>)
	Post-Learning How to Learn	Post-LHL	Identifying whether learning goals and knowledge deficits were filled as a result of one's experience and self-directed learning

Appendix A
Pre-Experience True/False Assessment Questions

1. Professional voice users are those individuals who use their voice in order to earn a living.
2. Actors are the largest occupational group most at risk for voice disorders.
3. Medical management for voice problems is best provided by a primary care physician.
4. Poor water intake is likely to lead to a voice disorder over and above the amount the voice is used and techniques used when producing the voice.
5. There is clear evidence that the muscles of the larynx can be strengthened with regular exercise.
6. Lesions on the vocal folds almost always require surgical removal.
7. Students studying to become teachers are educated about vocal health and maintenance during their teacher education programs.
8. Professional voice users frequently seek out help for voice disorders.
9. The modal vocal register is used most often during singing.
10. Greater subglottic pressure is necessary to produce a lower pitched voice.
11. All singers, regardless of genre, are at the same risk for developing voice disorders.
12. The three subsystems of voice are respiration, phonation, and resonance.
13. Clavicular breathing patterns are most optimal for supporting phonation.
14. Voice assessment involves listening to the voice for irregularities only.
15. Speech-language pathologists are the only professionals that differentially diagnose voice disorders.

Appendix B
Pre-Experience Reflection Questions

1. What do you currently know about the unique situations, needs, and demands (particularly in relationship to the voice) of singers, actors, and teachers? Your own situation and needs (vocally) as a future CSD professional?
2. What do you currently know about the content you will be presenting?
3. What confusions or questions do you have about the content you will be presenting? About vocal demands/needs of singers, actors, or teachers?
4. What do you hope to learn from developing and presenting this educational program?
5. What are your current professional goals and interests?

Appendix C
Pre-Program True/False Assessment

1. The primary function of the larynx is to produce voice.
2. Acid reflux can damage tissue in the larynx.
3. The larynx is made up of bones that encase the vocal cords.
4. The vocal cords are composed of layers of muscle and/or tissue.
5. Increases in vocal fold pitch occur when the vocal folds are lengthened and thinned.
6. Vocal fold vibration occurs because muscles open and close the vocal cords hundreds of time per second.
7. Vocal nodes (nodules) are almost always treated surgically.
8. Vocal nodules rarely occur in men.
9. Vocal nodules almost always noticeably compromise vocal quality, making it difficult to speak or sing for extended periods of time.
10. A forward tone focus or resonant voice may facilitate healthy voice production.
11. Milk may compromise vocal quality because it coats the vocal cords.
12. Humans have anywhere from 2 to 5 vocal cords.
13. When the vocal cords are dry, they vibrate more easily than when they are lubricated.
14. A speech-language pathologist is qualified to assess and behaviorally treat individuals with voice disorders.
15. An otolaryngologist may perform surgery on the voice box as well as conduct voice therapy.
16. The vocal cords can only be viewed via X-ray.
17. Muscle tension in the neck often leads to voice problems.
18. It is impossible to change the way one's voice sounds and is produced on a regular basis.
19. Voice and speech are the same thing.
20. Smoking often causes inflammation and irritation to the vocal folds, and as a result, cause a voice disorder.

21. When you drink water it directly hydrates the vocal folds.
22. Surgical management is a first line treatment for voice disorders.
23. Voice therapy can facilitate improvements in vocal technique that may facilitate the resolution of voice problems.
24. Voice disorders may be caused by intensive or inefficient voice use.

Appendix D
Audience Demographics Form

1. What is your age?
2. What is your year in school (e.g. freshman in college, sophomore in college)?
3. How many years have you been studying at Illinois State?
4. What is your Major?
5. List activities that you are involved in that require intensive voice use (i.e. singing, public speaking, radio, going out to socialize, etc.)?
6. Are these activities required by your major or in addition to it?
7. If you are employed, list job duties that require you to use your voice. (i.e. receptionist, server)
8. Have you ever taken voice or acting lessons/been in a choir?
 - a. How many years/months within only the last 10 years did you receive voice lessons? Please indicate the age you were when you started and (if applicable) stopped lessons. You can provide multiple age ranges if you stopped and started more than once during the last 10 years.
 - b. How many years/months within only the last 10 years did you receive acting lessons? Please indicate the age you were when you started and (if applicable) stopped lessons. You can provide multiple age ranges if you stopped and started more than once during the last 10 years.
 - c. How many years/months within only the last 10 years did you participate in a choir? Please indicate the age you were when you started and (if applicable) stopped participating in choir. You can provide multiple age ranges if you stopped and started more than once during the last 10 years.
 - d. How many years/months, within only the last 10 years, have you engaged in singing practice regularly (i.e. at least once per week)? Please indicate the age you were when you started and (if applicable) stopped vocal practice. You can provide multiple age ranges if you stopped and started more than once during the last 10 years.
9. Have you engaged in classroom teaching? If so, indicate approximate time you started month/year you began teaching and month/year you stopped teaching. How many times/week and for how long did you teach for during this time period?
10. Have you ever had a diagnosed voice disorder?
 - a. If so, please indicate the diagnosis.

b. Have you been diagnosed with a voice disorder more than once? If so how many times?

c. Please indicate approximately when you were diagnosed with the vocal disorder(s).

11. Have you ever had laryngitis (a period of voice loss) unrelated to sickness?

a. If so, please estimate how many times you have lost your voice since starting your college career at ISU?

12. Have you ever had any other undiagnosed voice problem other than laryngitis (a period of voice loss for a few days related to sickness or heavy voice use)?

a. If so, please describe each problem (if there is more than one) and indicate how many times you have had them and the estimated time that you had the problem.

13. Have you ever had voice therapy? If so, for approximately what time span(s) (month start-month end)? Approximate number of sessions during (each) time span? Where did you receive these services?

Appendix E
Pre-Program Reflection Questions

1. What kinds of activities do you engage in on a regular basis related to your major, extracurriculars, job, or social life?
2. Do you ever experience vocal difficulties related to these activities? If so, describe.
3. What do you currently know about the voice and voice disorders? Where did you learn this information (i.e. specific coursework, tv, etc.)?
4. How would you define a voice disorder?
5. What is voice therapy? How would you describe it based on your current knowledge?
6. What questions and/or confusions do you currently have about the voice and voice disorders?
7. Would you seek help if you had a voice problem? If so, where would you go to seek help?
8. Do you have any general concerns about your voice or caring for and protecting your voice? What do you worry about most when it comes to your voice, if anything?

Appendix F
Post-Program Reflection Questions

1. What themes most stuck out to you from the Inside Your Voice program?
2. How would you define a voice disorder?
3. How would you define voice therapy?
4. If you are not a Communication Sciences and Disorders (CSD) major, do you think there are any misconceptions about the vocal demands/challenges related to your future profession, extracurricular, or employment? What can CSD students learn from you?
5. If you are not a CSD major, how do you think the discipline of CSD is related to your future profession?
6. If you are a CSD major, what new information did you learn from today's event? Was there anything that surprised you?
7. If you are a CSD major, how did this experience shape your professional interests, if at all? Do you have new professional interests that you were not aware of prior to this event?
8. What misconceptions that you previously had about voice disorders and the voice have changed after today?
9. Would you seek help if you had a voice problem in the future? If so, where would you go to seek help?
10. What questions/concerns/fears/confusions do you have in relationship to the content presented today as it relates to you?

Appendix G
Post-Experience Reflection Questions

1. How did your experience in an instructional capacity help you better understand the information you presented?
2. What elements of the vocal health program do you believe were most central to facilitating audience members' learning? Your own learning?
3. How do you think your experience facilitating and creating this vocal program might inform you in your role as a graduate student and/or future professional?
4. What did you learn about the unique situation, needs, and demands (particularly in relationship to the voice) of audience members? Your own situation and needs (vocally)?
5. What confusions or questions do you still have about the content you presented? About the vocal demands/needs of singers, actors, teachers or other professional voice users?
6. How did this experience shape your professional interests? Do you have new professional interests that you were not aware of prior to this experience?
7. After this experience do you view teaching and the role of your instructors differently? If so, how?
8. After this experience do you view your own learning differently? If so, how?
9. What improvements would you suggest for the format of this IS (i.e. weekly meetings, content, etc)?
10. What improvements/modifications would you suggest for the format of the culminating *Inside Your Voice* presentation/event?

