

FEATURE ARTICLE

Examining PSM Students' Confidence and Competence with Presentation Skills

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"Those who misjudge their competence, talent, or character may meet with disaster. To the extent that they misjudge their knowledge and learning, they may not perform to the best of their potential or reach the goals they set for themselves—in the classroom as well as in the transition to clinic, conference room, or corporation" (Dunning, 2006, p.1).

COMMUNICATION, INCLUDING THE ABILITY TO DELIVER A PRESENTATION, IS ONE OF THE TOP SOFT SKILLS DESIRED BY EMPLOYERS BE-

CAUSE POSSESSING TECHNICAL ABILITY ALONE IS

not sufficient for employees to succeed in the 21st-century workplace. The demand for soft skills can be problematic for technically-minded graduate students who may be lacking these skills, because soft skills, and communication skills in particular, can be challenging to teach and difficult for students to master. Industry demand for soft skills like communication influences graduate education—specifically, professional science master's (PSM) programs. PSM programs may refer to courses that teach soft skills or transferable skills as PLUS courses. David King described these courses as being designed to "provide STEM graduates with job-related skills to prepare them for supervisory or management positions." These PLUS courses, or more commonly called transferable skills courses, include courses on communication as well as ethics, leadership, management, teamwork, and many other specialized topics.

Graduates from STEM PSM programs are expected to be able to communicate technical concepts and results to a wide variety of audiences. Some students avoid communication, and presentations in particular, because they may not recognize the ultimate importance of communication skills; some may lack confidence in their presentation skills; some may experience public speaking apprehension or anxiety. Whatever the cause, students may be missing opportunities to develop the presentation skills necessary for the workplace.

Even when students do engage in developing their communication skills, students' self-reported level of confidence with their presentation skills do not always match their instructor-assessed competence. The mismatch of confidence and competence can make it difficult for students to develop and improve the presentation skills that are needed for their future careers. If students are overconfident, they can miss the chance to improve their skills and may make poor decisions. Students who underestimate themselves could be at risk for imposter phenomenon (IP). Pauline Clance and Suzanne Imes introduced the idea of IP, which refers to the feeling of phoniness despite accomplishments. Although the original research about IP focused on women, both men and women can experience it, and it is common in university settings. Either overestimation or underestimation provides an opportunity for improvement because accurate self-assessment can play an important role in learning. In David Dunning's book, *Self-insight*, he indicates that knowing strengths and weaknesses in a certain domain can be beneficial to improving them.

About This Study

Inspired by Justin Kruger and David Dunning's 1999 study about incompetence and self-assessment, a study was conducted to examine how PSM Analytics students' self-reported confidence with their presentation skills relates to instructor-assessed competence of those students' presentation skills. Data was collected from 215 (out of a possible 230) PSM graduate students from a PSM program at a southern public land-grant research university. The data came from ungraded student reflection responses and three instructors' assessment

ratings (not grades). Two measurements were used: (1) student reflection responses collected four times over the span of five months consisting of ratings of one to five to indicate confidence with presentation skills and (2) instructors' ratings of one to five to indicate the students' competence with presentations skills. For students, the rating of one indicated "Not Confident" and the rating of five indicated "Very Confident." Instructors used the range of one to five for competence ratings with one labeled as "Novice," two labeled as "Beginner," three labeled as "Average," four labeled as "Proficient," and five labeled as "Expert."

The Dunning-Kruger Effect (DKE) provided a framework to consider presentation confidence and competence in PSM graduate students. In short, the DKE was named for Kruger and Dunning's 1999 study that found those who were incompetent in a skill were more likely to overestimate their ability because of a lack of metacognition. In addition, those who were highly skilled tended to underestimate their expertise. The main take away is that those in the bottom quartile tend to overestimate their performance while those in the top quartile tend to underestimate their performance.

Students' Self-Reported Confidence

To determine students' self-reported confidence, median, mode, and percentages were used to analyze the confidence ratings from each of the four points of collection. The four points of collection show that overall, most students rated their confidence as a three or four. A rating of one for confidence was the least likely rating. Not a single student selected a rating of one at the fourth point of collection. In Figure 1, all four points of confidence collection are shown next to each other for comparative purposes.

Digging in a little deeper, students' confidence ratings over time show that almost a quarter of the students entered the same confidence rating at all four points of collection. The highest number of students entered the same confidence rating for point two and point three. The most students selecting increased confidence ratings occurred between point three and point four. The most students entering decreased confidence ratings occurred between point one and point two.

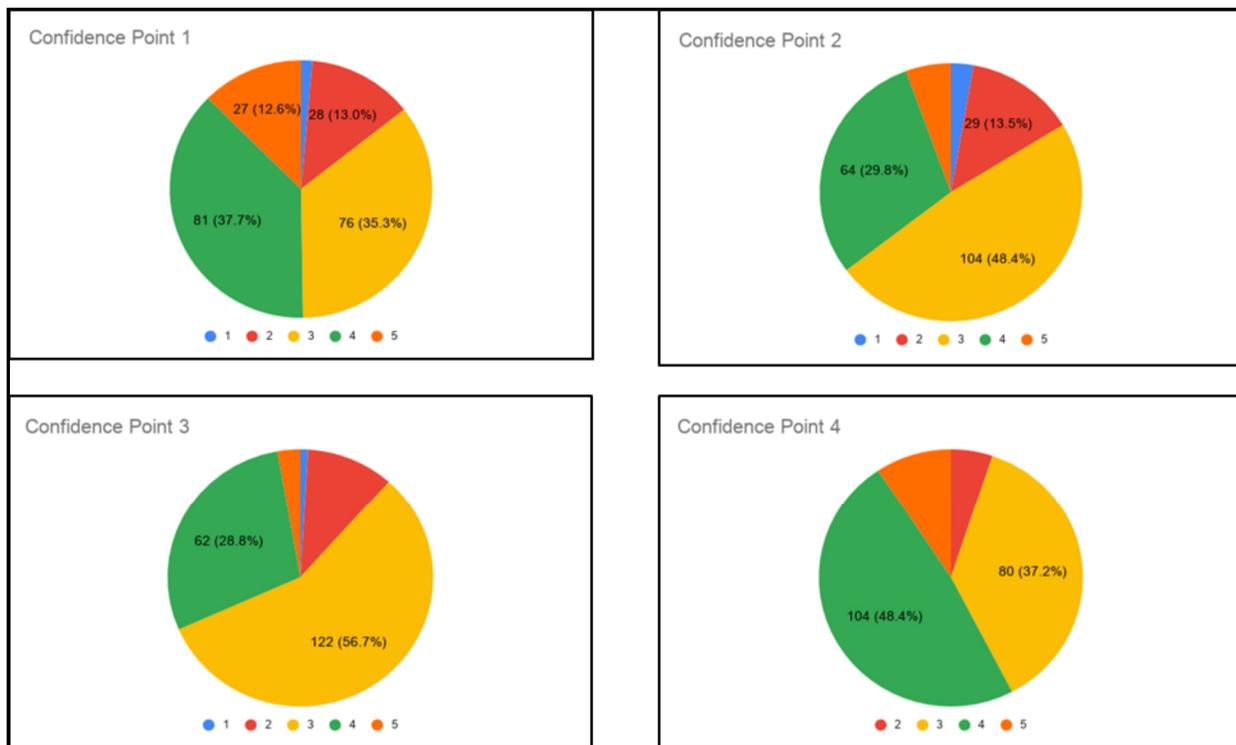


Figure 1. Percentages for all four points.

Three Instructors' Competence Ratings for Students' Skills

Median, mode, and percentage were used to analyze the three instructors' competence ratings for the students' presentation skills. For both median and mode, the competence ratings for all 215 students was a three. A more detailed picture of the competence ratings can be seen in Figure 2.

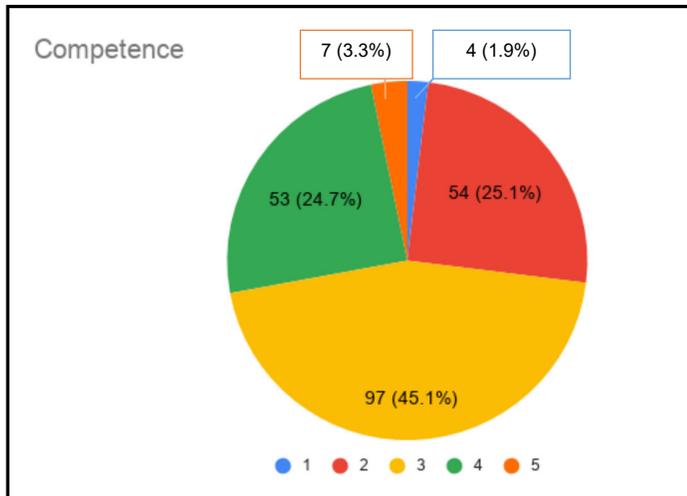


Figure 2. Percentages of competence ratings.

Figure 2 shows that most of the students received a rating of three. About a quarter of the students received a rating of a two or a four. On the extreme ends of the rating continuum, the remaining students received a rating of one or five.

Comparing Students' Confidence and Instructors' Ratings of Competence

At each point of collection, students' confidence ratings were compared to the instructors' competence ratings of their presentation skills. The results shown in Figure 3 indicate the percentage of students whose confidence ratings were equal, overestimated, or underestimated the instructors' competence ratings.

The frequency of equal estimation rose from point one to point two and topped out at point three before dropping to its lowest at point four. Overestimation dropped at point two and again at point three before rising at point four. The highest underestimation frequency occurred at point two. It is important to note that the point one collection of confidence ratings happened before students began their PSM program. Point two occurred shortly after orientation. Some calibration in ratings seems to have occurred.

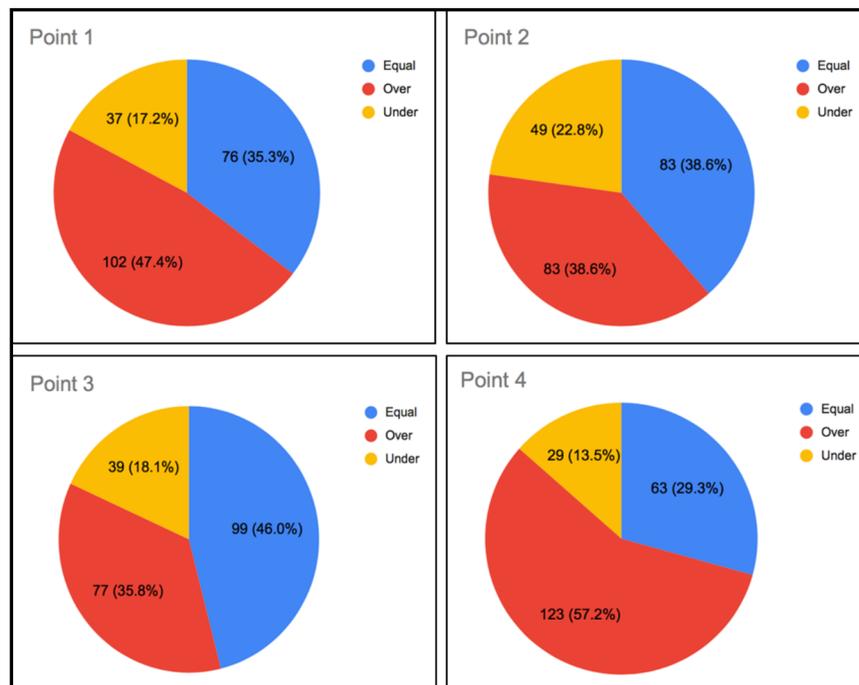


Figure 3. Rating comparisons for all four points of collection.

curred after students met their classmates. Point three occurred after two presentation experiences and feedback from the main instructor. Here we see the most agreement between confidence ratings and competence ratings. The last point of collection for confidence occurred at the end of an intensive presentation training workshop. The overestimation at point four does not necessarily indicate a problem. Instead, the increase in confidence ratings align with the goals of the presentation training workshop—providing instruction and an opportunity to practice presentation skills to improve students’ confidence.

All four points of confidence collection showed the pattern of the lowest performers (the incompetent) overestimating and the highest performers (competent) underestimating. However, the findings from point four is the strongest support for the DKE pattern as shown in Figure 4.

Significance of Relationship Between Confidence and Competence

Spearman’s correlations were calculated to determine whether a statistically significant relationship existed between students’ self-reported confidence with presentation skills and instructors’ rating of their presentation competence. Using McHugh’s categories for interpreting the correlation coefficients, the findings show only a moderate positive correlation (with points one and two falling on the lower end of the moderate scale). If using different researchers’ categories, points one and two could be considered low or weak. The examination of Spearman’s correlation shows a generally positive moderate correlation. It implies that competence ratings increase when confidence ratings increase. The findings also indicate that the highest correlations occurred at point three and point four when students had been interacting with the instructors the longest.

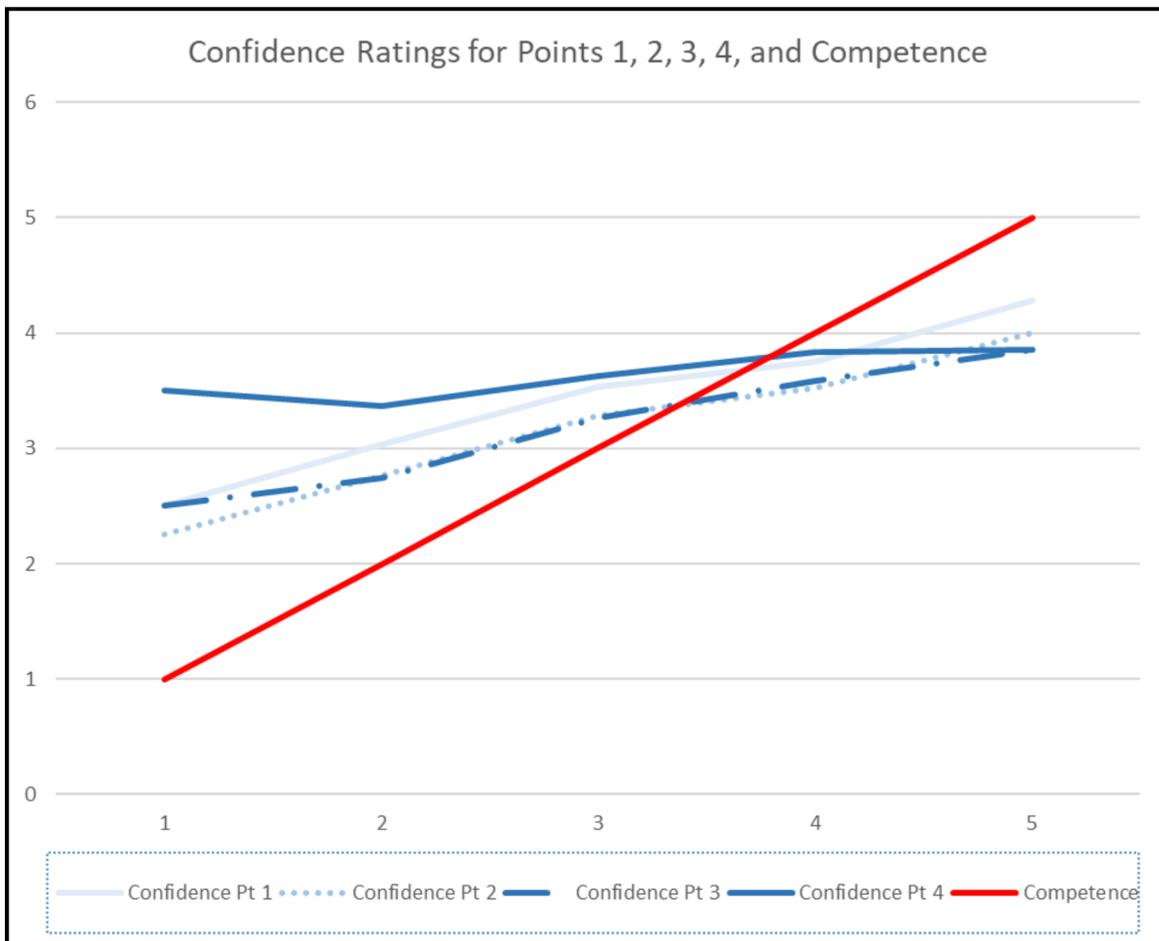


Figure 4. Confidence rating for all four points compared to competence.

Sex and Age

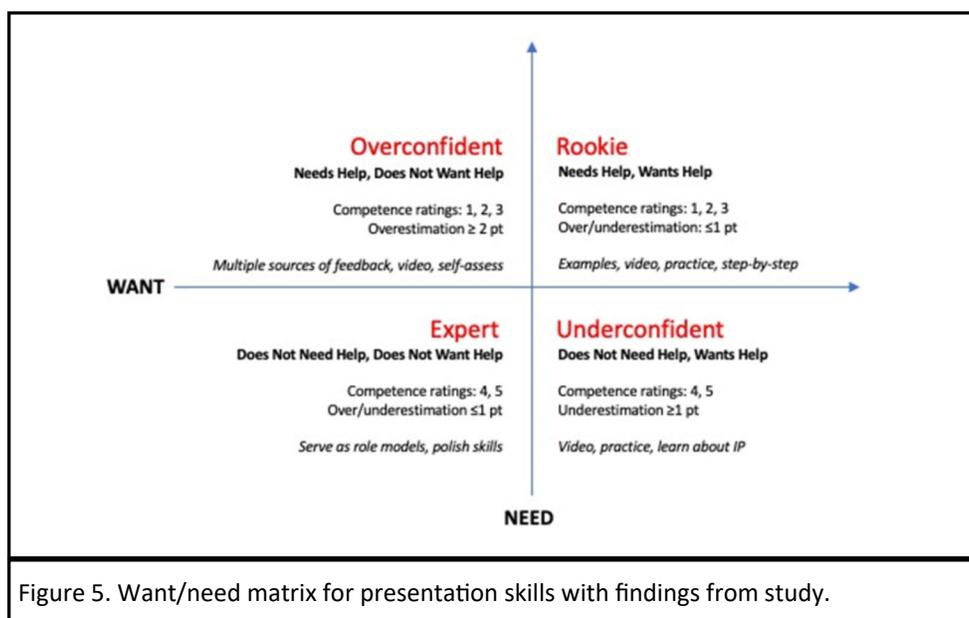
Descriptive statistics and regression were used to determine whether the students' sex or age significantly influenced students' self-assessed presentation confidence ratings. A p-value of 0.05 was used to determine significance. The population in this study was relatively balanced in terms of sex (men = 57.21% and women = 42.79%). Note that this study used biological sex or sex assigned at birth, and not gender or gender expression, because that was how the data was collected at the time of student application. The age variable was converted into the binary categories of older and younger by taking the students' median age of twenty-four and separating students into older (meaning 24 years and above) and younger (meaning 23 years and below). The results of the multiple linear regression indicated that neither of the two variables (sex and age) influenced the confidence ratings. In addition, interactions between sex and age did not indicate any influence on confidence ratings.

Applying Results to Practice

The findings from the study can help inform approaches to teaching and supporting presentation skills for PSM students. The want/need presentation matrix shown in Figure 5 can be used to categorize students using the results from the confidence and competence ratings analysis. Even without a formal study, PSM instructors may find the matrix categories in Figure 5 useful when considering ways to support students' development.

The Rookie quadrant is labeled needs help and wants help, which means that these students are open to feedback in order to improve. The Rookies include the students receiving a rating of one, two, or three in competence who did not overestimate or underestimate their confidence ratings by more than one point. To support these students, instructors can follow Adam Persky and Jennifer Robinson's instructional tips for novices: students need clear directions, feedback, and practice.

The Underconfident quadrant is for students who do not need help but want help. The Underconfident include students rating a four or five in competence who consistently underestimated, especially those who underestimated by two points. Students in the Underconfident quadrant present well but doubt their abilities despite being told they are doing well. They seek out extra attention and support. Another label for this quadrant could be students experiencing imposter phenomenon (IP). Underconfident students can be supported by teaching them about IP and encouraging them to apply some of Sindhumathi Revulari's strategies to combat IP such as focusing on accomplishments, avoiding comparisons, and accepting feedback. In addition, providing specific feedback, using video, and offering opportunities for practice can help the underconfident students improve their presentation skills. Students in the Rookie quadrant and the Underconfident quadrant could benefit from working together to develop and hone presentation skills in a low-stakes environment.



The Expert quadrant of students do not need help and do not want help. The Experts include students receiving a competence rating of four or five who did not underestimate by more than one point. These students are not resistant to feedback, rather they are not actively looking for feedback, because they have confidence in their established presentation skills. However, these presenters can be open to recommendations for improvement and are able to apply feedback rather easily. The Experts do not seek out or need intervention from the instructor, but they still need support. The feedback about what was done well must be explicit and the Experts must be encouraged to continue to grow and improve their skills—even if it is just to polish already strong presentation skills. Experts could be encouraged to be role models for the Rookie, Underconfident, and Overconfident students.

As PSM programs work to develop and hone transferable skills courses that serve the needs of the graduate students during their studies as well as in their future careers, examining students' confidence and competence may be revealing. Accurate self-perception is important in developing communication skills.

The Overconfident quadrant includes students who need help, but do not want help. The Overconfident are ignorant of their own incompetence. Overconfident students are students who overestimated by two or three points. These students present the biggest challenge because of their misconception of their skills. They can be resistant to feedback about areas of improvement that are greatly needed. Kruger and Dunning would call this a miscalibration of confidence and competence. Whatever the case, the students in the Overconfident quadrant are in

need of improvement but are blind to their deficiencies, even when explicitly told. Despite feedback from instructors and peers, students in the Overconfident quadrant fail to calibrate their confidence ratings. In *Self-insight*, Dunning warns that “many poor performers push back. They rebel against the advice; they argue points of view that contradict their own” (p. 286). To overcome the challenge of teaching the Overconfident student, providing multiple sources of feedback including self-assessment, peer assessment, and instructor assessment can help highlight areas of improvement. The use of video and the opportunity to self-assess performances allows the overconfident student a chance to calibrate. Using the want/need matrix, the researcher can more systematically support students in the development of their presentation skills during their PSM program. PSM instructors could also use this want/need matrix along with other recommendations for policy and practice.

Best Practices Recommendations

Based on the findings from the study, the following three best practice recommendations are suggested for PSM practitioners and policy makers.

- **Develop opportunities to practice and improve self-assessment.**
Having students watch, assess, and reflect on recordings of their presentations has the potential to bolster both their presentation and self-assessment skills. For students in the Overconfident quadrant, the recording of their presentation could highlight problems in a more powerful way than written or verbal feedback from instructor or peers. Video of students from the Underconfident quadrant can show that the presentation was actually better than the student thought it was. A common response from students in the Underconfident quadrant is: “it doesn’t look as bad as I felt giving that presentation.”
- **Ensure that transferable skills courses in communication provide appropriate individualized feedback for presentation skills.**
Feedback is particularly challenging because PSM programs take different approaches to teaching PLUS/transferable skills courses. Heidi Harkins and Linda Strausbaugh reported that it is common to have internal faculty and external

professionals jointly teach transferable skills. Having a policy that encourages best practice in providing feedback could be helpful. Feedback norming activities with instructors, especially those outside the university, could provide students with consistent feedback.

- **Analyze data about students' soft skills confidence ratings and competence ratings to develop a clearer picture of students' abilities.** It is one thing to have a hunch about students' assessment of their own skills. However, actually analyzing the data provides valuable insights. After analyzing the results, use the want/need matrix to identify the ways that students could be supported in their efforts to develop their presentation skills.

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Limitations

The first limitation of the study was the use of self-assessed Likert-scale data because students may not have interpreted the scale the same way. Another concern for the interpretation of the Likert data is that relying on expert judgement can be problematic. To address that concern, three expert instructors determined the ratings for competence. However, just like the students' potential differential use of the scale among other students, the three instructors and the students may not have used the scale the same way. In addition, the honesty of the students' rating is a limitation of any self-assessment. Students may have overrepresented or underrepresented their ratings for a variety of reasons including their personality, upbringing, and culture.

The second limitation of this study is that it looked at only two variables to determine if they influenced students' confidence ratings. Although limited, the choice of the two variables of sex and age was intentional. This study was inspired in part

by Kruger and Dunning's findings in their 1999 study that indicated that gender did not influence overestimation or underestimation. Kruger and Dunning's participants were undergraduate students. Therefore, for this study, it was important to add age as a variable to determine if older or younger men and women rated themselves differently on the confidence scale. Additional variables could provide a different picture of PSM students' confidence and competence. However, that was outside the scope of this particular study, but it does provide inspiration for future studies.

Conclusion

As PSM programs work to develop and hone transferable skills courses that serve the needs of the graduate students during their studies as well as in their future careers, examining students' confidence and competence may be revealing. Accurate self-perception is important in developing communication skills. As Dunning indicates in *Self-insight*, "people need to know what their strengths are... They need to be aware of their weaknesses so that they can improve upon them" (p. 2). The study has unveiled important information for the researcher and for other PSM programs about confidence and competence with presentation skills. Although this study focused on presentation skills, it is possible that similar studies could be used for other transferable skills courses.

References

- Clance, P. R., & Imes, S. A. (1978). The imposter phenomenon in high achieving women: Dynamics and therapeutic intervention. *Psychotherapy: Theory, Research and Practice*, 15(3), 241–247. <https://doi.org/10.1088/0022-3727/32/16/312>
- Dunning, D. (2005). *Self-insight: Roadblocks and detours on the path to knowing thyself*. New York: Taylor & Francis Group. Retrieved from <https://ebookcentral.proquest.com/lib/ncsu/reader.action?docID=199801&ppg=165>
- Dunning, D. (2006). Not knowing thyself. *The Chronicle of Higher Education*, 52(35), B24.
- Harkins, H., & Strausbaugh, L. D. (2017). 20 years and counting: How has PSM training in "transferable skills" changed? *The Innovator: The*

Voice of the PSM, 10(3), 4299–4312. Retrieved from https://www.professionalsciencemasters.org/sites/default/files/the_innovator_curated_issues_fall_2017_vol_10_issue_3.pdf

King, D. (2012). Developing professional science master's degree programs. In *PSM Pre-Conference Workshop*. Council of Graduate Schools Annual Conference.

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121–1134. <https://doi.org/10.1037/0022-3514.77.6.1121>

McHugh, M. L. (2018). Spearman correlation coefficient. In B. B. Frey (Ed.), *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation* (pp. 1555–1558).

Persky, A. M., & Robinson, J. D. (2017). Moving from novice to expertise and its implications for instruction. *American Journal of Pharmaceutical Education*, 81(9), 72–80. <https://doi.org/10.5688/ajpe6065>

Revuluri, S. (2019). How to overcome impostor syndrome. *The Chronicle of Higher Education*.

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