# An Analysis of Professional Development Impact on Teacher Confidence in Turfgrass Science

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## Introduction

The demand for teachers in career and technical education (CTE) to incorporate science, technology, engineering, and math (STEM) within their curriculum has increased in recent years (Asunda, 2014). Often, agricultural science teachers face challenges developing curriculum and effectively integrating STEM into their programs (Smith et al., 2015). Agricultural science teachers have a unique opportunity to construct learning opportunities for students in the laboratory and classroom settings. Professional development has led to improved teaching practices and student outcomes by promoting integration of quality knowledge and utilizing rigorous standards (Drape et al., 2016). Professional development has also been reported to increase teacher efficacy in terms of knowledge, skill acquisition, and post-training performance which increases the likelihood that teachers will incorporate their new knowledge into their courses (Bray-Clark & Bates, 2003). The purpose of the study was to determine the effectiveness of a professional development workshop in teaching efficacy and intent to implement turfgrass curriculum. The objective of the study is to describe and analyze levels of perceived efficacy and intent to implement content before and following the workshop.

## Theoretical Framework

The theoretical framework for this study is Ajzen's Theory of Planned Behavior. This theory is guided by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). An individual's attitude toward the behavior includes their beliefs about the consequence of the behavior. If an individual perceives a positive outcome, they are likely to engage in that behavior (Ajzen, 2006). Subjective norms refer to the social pressure one receives from others to either perform or not perform the behavior. If an individual feels strong about these pressures, they will follow them. Subjective norms can be influenced by opinions of others, social norms, and a range of other factors (Ajzen, 2002). Perceived behavioral control is the last factor in the Theory of Planned Behavior in which considers an individual's perceived ability to perform a behavior (Ajzen, 2006). Resources, environmental constraints, and personal competence can influence behavior control. Providing individuals with resources and preparing them with essential skills can increase perceived behavior control and they are more likely to engage in the behavior (Ajzen, 2006).

## Methods

Agricultural science teachers from around the state were invited to attend a one-day professional development course hosted by Texas Tech University and Texas A&M University. Thirty participants engaged in lecture and lab portions of turfgrass science topics such as career paths, hands-on stations, and turfgrass technology and research. Teachers also toured Texas A&M University's ballpark and a grow facility. Participants completed a pre and post survey using Qualtrics that consisted of Likert-type scale questions (1 = strongly agree, 5 = strongly disagree). The data was entered into IBM SPSS Statistics and analyzed for means and standard deviations. This data is a subset of a larger study.

## Results

Table 1 outlines the responses of the pre-survey and the post-survey that followed the completion of the professional development event. The statement with the highest mean in the pre-survey results was "I am confident in teaching a ½ credit turfgrass management unit" (*M = 3.26, SD = 1.17*), and the statement with the lowest mean was "I plan to utilize the iCEV curriculum" (*M = 1.96, SD = 0.74).* After the participation in the professional development, the same statement with the highest mean was "I plan to develop my own learning modules" (*M = 2.32, SD = 1.01*), and the statement with the lowest mean was "I plan to utilize the iCEV curriculum" (*M = 1.44, SD = 0.57*). The overall mean deceased from the pre to the post-survey.

**Table 1**

*Analysis of Pre and Post Instrumentation Responses (N = 30)*

| Statement | Pre- Survey Response | | Post- Survey Response | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| I am confident in teaching a ½ credit turfgrass mgmt. unit | 3.26 | 1.17 | 1.80 | 0.69 |
| I plan to implement turfgrass mgmt. | 2.48 | 0.92 | 2.12 | 0.86 |
| I plan to incorporate turfgrass mgmt. into an existing course | 2.41 | 1.06 | 1.88 | 0.65 |
| I have students with an interest in learning about turfgrass | 2.26 | 0.07 | 2.08 | 0.63 |
| I plan to utilize the iCEV curriculum | 1.96 | 0.74 | 1.44 | 0.57 |
| I plan to develop my own learning modules | 2.89 | 0.92 | 2.32 | 1.01 |
| Overall | 2.54 | 0.81 | 1.94 | 0.74 |

## Conclusions/Implications/Recommendations

It can be concluded that teachers are more confident in teaching a turfgrass management course after receiving professional development. Teachers are also more likely to implement turfgrass management into their programs, and perhaps even implement the content into a course that they are currently teaching. Teachers are more likely to use curriculum that has already been created, but still agree that they feel more confident to make their own modules. This aligns with the results from Bray-Clark & Bates (2003) that found professional development is needed to increase confidence and implementation of subjects. This data also aligns with the Theory of Planned Behavior, as the teachers became more exposed to curriculum their confidence increased, and they stated they are more likely to perform in the classroom. Professional development should be offered and implemented more to increase teacher confidence and further integrate STEM education. Paulsen et al. (2014) states that workshops have the potential to change in-service teacher behavior, but for long- term results, ongoing support is needed to maintain confidence. Therefore, workshops such as this should be offered more than once a year and conducting a longitudinal study could determine the effectiveness of this professional development event. More workshop events should be implemented and measured to gain a more complete picture of their confidence in creating their own modules to teach the content.

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