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Keywords

Senegalese professors, higher education, training and development, learner-centered instruction

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Abstract

The Senegalese agricultural sector suffers from an inadequate number of skilled workers. On January 24, 2011, the United States Agency for International Development (USAID) launched the Education and Research in Agriculture (ERA) project to increase the number of skilled workers entering the agriculture supply pipeline. To achieve this goal, ERA provided professors with materials, resources, and the knowledge for incorporating learner-centered strategies in their curriculum. The purpose of this study is to describe the intentions of Senegalese agriculture professors in engaging in learner-centered instructional strategies. The theoretical framework guiding this study is Ajzen's (1991) Theory of Planned Behavior, which identifies predictors that leads to an individual's intention to engage in a certain behavior. Data were collected using survey questionnaire. Agriculture professors (n = 40) from three public universities and two training institutes affiliated with the universities completed the survey questionnaire. Purposive sampling was used to select professors from schools that had close involvement with the USAID-ERA project. Findings suggest that Senegalese professors are engaging or intend to engage in a few learner-centered (LC) instructional strategies; have a positive attitude but still suffer from cognitive dissonance; have some challenges with subjective norms; and lack adequate self-efficacy that is necessary for engaging in LC instructional strategies. Continuous trainings that delineate the positive outcomes of engaging in LC instructional strategies is recommended to resolve the cognitive dissonance that many still have. We recommend future studies to investigate the degree of influence as measured by attitude, subjective norms, and perceived behavioral control.

Keywords: Senegalese professors, higher education, training and development, learner-centered instruction

Introduction

Higher education in Senegal, like many other African countries, faces a variety of challenges that range from limited access to institutions to a strict and structured curriculum that leaves little room for teacher agency (Bravo-Ureta, Maas, Diouf, & Ndoye, 2012; Erbaugh, Crawford, & Adipala, 2009; Teferra, 2004). According to Bravo-Ureta et al. (2012), the Senegalese agricultural sector suffers from a shortage of skilled workers due to inadequate education. Current methods of instruction, classroom structure, and curriculum have contributed to the lack of technical skills in the workforce (Horst, 2016).

The prevalent method of instruction in Senegalese institutions of higher education is the traditional teacher-centered (TC) lecture strategy, which was passed down by colonial France (Horst, 2016). However, while developed countries like France have moved beyond passive strategies and are engaging in more learner-centered (LC) instructional strategies, developing countries like Senegal are still engaging in more TC strategies. A TC strategy is an efficient way to instruct multiple learners through information memorization; however, this autocratic 'one method fits all' approach is insensitive to the various learning needs of students (Brown, 2003). As more educators ascribe to the philosophy that students' learning needs are diverse and instructional strategies should reflect various learning styles (Faitar, 2011), many developing countries have yet to make the transition, even with more instructional training being implemented in these countries.

There are different definitions for LC instructional strategies, which is indicative of its many forms (Baeten, Kyndt, Struyven, & Dochy, 2010). However, the central theme is that a LC instructional strategy should be collaborative, activity-based, less

rigid, and adapted to the needs of students (Ginsburg, 2010; Horst, 2016; Prince, 2004). Many studies have looked at different forms of LC instructional strategies, and findings are mixed. While there is evidence to suggest that LC instructional strategies lead to improved performance, some studies have reported no significant relationship between some forms (e.g., cooperative learning) and individual learning outcomes (Hanze & Berger, 2007; Krause, Stark, & Mandl, 2009). Rather, these studies have reported a direct relationship between LC instructional strategies and increased self-efficacy, autonomy, perceived competence, motivation, and engagement (Anderson, 2013; Cheang, 2009; Dunlap, 2005), which ultimately leads to improvements in academic performance and higher cumulative grade point averages (Carroll et al., 2009; Yusuf, 2011). McCombs, Daniels, and Perry (2008) found that students' perceptions of their teacher's LC practices were significantly related to their motivation for learning.

LC teaching practices have also been linked to promoting psychological safety and a supportive learning environment for students (Zumbrunn, McKim, Buhs, & Hawley, 2014). Many studies have shown that a supportive classroom environment predicts students' sense of belonging, which in turn predicts their motivation to learn, engagement and performance (Connell & Wellborn, 1991; Zumbrunn et al., 2014). These results lead us to the conclusion that some learner-centered approaches directly impact performance in ways that can be measured in the short-term while others impact performance that must be measured over an extended period of time.

Despite the documented benefits of LC instructional strategies, the majority of Senegalese professors still engage in the traditional TC strategies (Ahmed, 2013; Brown, 2003). While many factors could

cause this lack of adoption, teachers' self-efficacy is one factor that has been widely studied related to teachers' intentions. Several studies have reported that teachers' self-efficacy have been identified to affect teachers' motivation to adopt new teaching methods, especially in cases where there is already a positive attitude (Althausen, 2018; Caraway, Tucker, Reinke, & Hall, 2003; Silm, Tiitsaar, Pedaste, Zacharia, & Papaevripidou, 2017). Silm et al. (2017) found teachers' unwillingness to engage in inquiry-based learning (IBL) was due to low self-efficacy as a result of a lack of requisite knowledge that is necessary to implement the instructional strategy in their classrooms. However, they found that targeted training with subsequent support improved self-efficacy and a readiness to adopt IBL. Similarly, Althausen (2018) found a significant difference in preservice elementary teachers' self-efficacy in teaching mathematics as a result of participating in an elementary methods course than those who had not had such training.

Senegalese professors' engagement in more TC strategies has negative implications for the quality of education and ultimately the quality of their graduates. Due to the high demand for skilled workers in the Senegalese agricultural sector, it behooves professors to employ a variety of instructional strategies that would meet the learning needs of the students as well as address the competencies of the industry in order to guarantee a capable workforce (Bravo-Ureta et. al., 2012). Accordingly, the purpose of this study was to explore the intentions of Senegalese agriculture professors involved in the USAID-ERA project to engage in LC instructional strategies in an effort to identify opportunities for exploration and investment related to international agricultural education and training.

Theoretical Framework

The theoretical framework guiding this study is Ajzen's (1991) Theory of Planned Behavior – an extension of the Fishbein and Ajzen's Theory of Reasoned Action. Ajzen's theory predicts an individual's intention of engaging or performing in a certain behavior by measuring three factors– attitude, subjective norms, and perceived behavioral control (see Fig. 1).

Three types of beliefs serve as the antecedents to the interrelated constructs of *attitude*, *subjective norms*, and *perceived behavioral control*, which shapes one's intention and thus behavior. The three beliefs are: behavioral beliefs about the likely outcome of performing a behavior, thus shaping one's attitude; normative beliefs about the attitude or expectations of important referents in one's social environment about the behavior that lead to subjective norms; and control beliefs about the presence of factors that may hinder or facilitate performance of the behavior that forms one's perceived behavioral control (Ajzen, 2012; Patterson, 2009). Accordingly, the more favorable one's attitude and subjective norms are, and the more enabling one's perceived behavioral control is; then the stronger one's intention to perform a behavior would be (Ajzen, 1991, 2012; Underwood, 2012).

In this study, perceived behavioral control is conceptualized as self-efficacy, since this is within the context of teaching and learning (Ajzen, 2012; Fishbein & Capella, 2006; Macfarlane & Wolfson, 2013). The belief that one possesses the resources, skills, and abilities necessary to perform a behavior will lead to self-efficacy, which in turn will lead to intention (Fishbein & Capella, 2006). Moreover, there is evidence to suggest that increased self-efficacy directly predicts increased persistence and performance in a behavior

(Ajzen, 2012; Bandura & Locke, 2003). Teachers that are confident in their ability to effectively perform a behavior, will most likely persist in performing that behavior,

thereby increasing the likelihood of its performance.

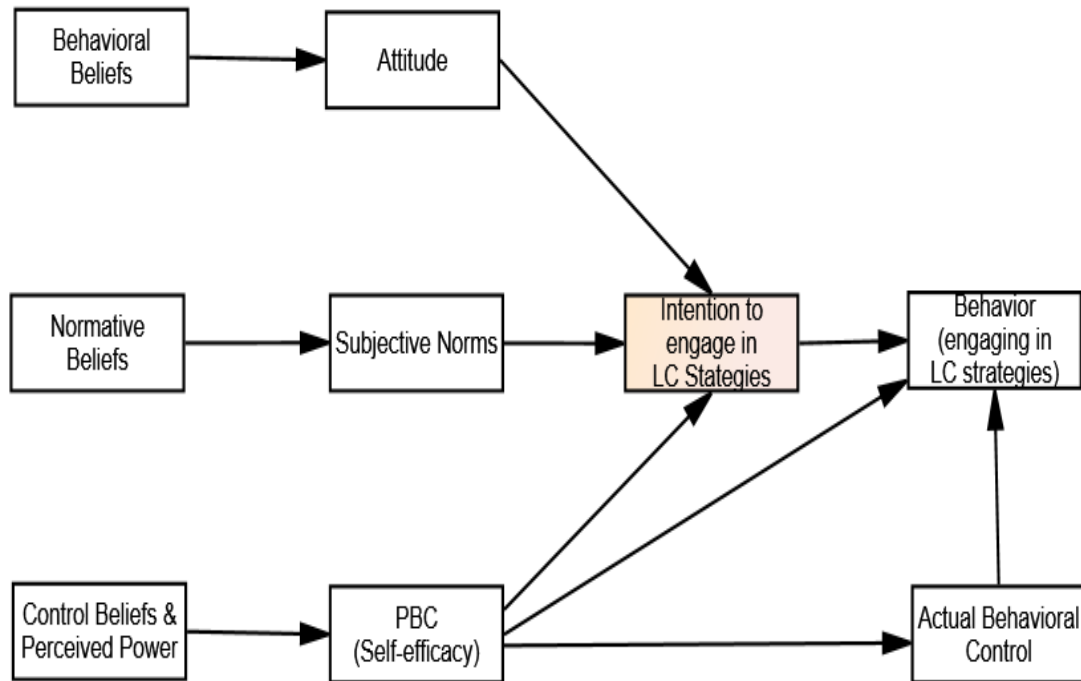


Figure 1. Theory of Planned Behavior and its component parts (adapted from Fishbein & Capella, 2006).

Although these three components influence an individual’s intentions to engage in, perform or act on the behavior in question, it is important to note that these three factors do not guarantee actual behavioral performance. However, knowing one’s intentions toward a behavior is the best predictor of actual behavioral performance (Ajzen, 1991; Bunch, Blackburn, DanJean, Stair, & Blanchard, 2015). According to this theory, professors will have greater intentions to use LC instructional strategies if they: 1) have positive attitudes toward engaging in LC instructional strategies (attitudes); 2) receive positive reinforcement from important referents in their environment to engage in these methods (subjective norms); and 3)

believe that they are capable of effectively performing the behavior (self-efficacy).

Research Objectives

On January 24, 2011, the United States Agency for International Development (USAID) launched the USAID’s Education and Research in Agriculture (USAID-ERA) project, consistent with the Feed the Future (FTF) strategic plans. “Within the FTF strategic plan, ERA contributes to increased human-resource capacity by assisting Senegalese Agriculture Education, Training, and Research (AETR) Institutions” (USAID, 2014, p. 3). Currently, higher education institutions frequently contract part-time professors known as *vacataires* to teach specific subject areas, limiting the amount of

contact students have with full-time faculty. However, as the decision-makers related to the curriculum and instructional strategies that are normalized within the institution, the USAID-ERA project has focused on efforts to increase the amount and quality of instructional contact full-time professors have with students. To achieve this, the USAID-ERA project provided professors with materials, resources, and the knowledge for incorporating more learner-centered approaches in their curriculum. This study assessed the intentions of the professors trained to utilize the resources and instructional strategies in their agricultural classes. The research objectives that guided the study were to describe (a) the descriptive characteristics of Senegalese professors; (b) professors' attitude towards LC instructional strategy; (c) the subjective norms that may hinder/encourage the effective adoption of LC instructional strategy; and (d) how professors' self-efficacy may affect their adoption of LC instructional strategy.

Methods

Data were collected using a 55-item survey questionnaire that explored Senegalese agriculture professors' intention in engaging in LC instructional strategies. Using the Theory of Planned Behavior (Ajzen, 1985, 1991), a 4-part survey questionnaire was constructed; it ranked responses on a 5-point Likert scale ranging from '1-Strongly disagree, 3-Neutral, and 5-Strongly agree'; dichotomous "yes" and "no" questions; ranking questions; and close-ended responses. Professors were asked to rank their level of agreement on questions from four sections. The first section measured the descriptive characteristics of professors. Professors were asked about their demographic and teaching background. It included ranking questions that determined professors' role at

their respective institutions; close-ended questions on courses they currently taught; average class sizes; and teaching experience.

In the second section, professors were asked to identify current teaching and learning strategies, as well as major challenges (pedagogical or material) currently faced using a dichotomous "yes" and "no" questions and close-ended questions. It also measured professors' attitude towards LC strategies. We used a 5-point Likert-type scale ranging from '1-Good, 3-Neutral, and 5-Bad' to assess professors' attitudes towards more learner-centered methods. The third section measured the social pressures that professors felt from their peers, administration, and institution in incorporating new learner-centered practices. They were asked to indicate the level of agreement with statements about their social environment from 1-Strongly agree and 5-Strongly disagree. In the last section of the questionnaire, professors were asked about their perceived confidence (self-efficacy) in applying LC instructional strategies into their curriculum. Responses were measured on a 5-point Likert scale ranging from '1-Strongly disagree, 3-Neutral, and 5-Strongly agree'.

The questionnaire was developed in English and reviewed for construct and face validity (Pedhazur & Schmelkin, 1991) by a panel of four experts in education, international development, Senegalese culture, and instrumentation. Test-retest reliability was conducted with 11 doctoral students in agriculture using a 7-day time interval (Pedhazur & Schmelkin, 1991). Coefficients of stability ranged from .78 to 1.0, with allocation of time being the lowest and teaching tools used being the highest. Finally, the questionnaire was translated into French and reviewed for accuracy by a French-speaking Senegalese and a native English-speaking professor fluent in French.

The paper version of the questionnaire was administered in person in Senegal to agriculture professors ($n = 40$) at three public universities: Cheikh Anta Diop University of Dakar (UCAD), Assane Seck University of Ziguinchor (UASZ), Gaston Berger University of Saint Louis (UGB); and two training institutes affiliated with the university: National Advanced School for Agriculture (ENSA) and Institute for Advanced Rural and Agricultural Training (ISFAR). The purposive sample consisted of a census of the full-time professors that were currently teaching agriculture-related courses in a formal classroom environment in at least 1 of the 5 Senegalese partner institutions who were trained through the USAID-ERA project. Frequencies were tallied for each of the 55 items and analyzed

for trends in attitude, subjective norms, and perceived behavioral control.

Findings

Professors' Descriptive Characteristics

The sample of professors included 35 males and five females (see Table 1), with equal representation of 20 participants coming from the training institutes ENSA and ISFAR and the universities UCAD, UGB, and UASZ. The average years of teaching experience ranged from 5 years to 23 years, with males reporting an average of four years more teaching experience than females. Finally, the average class size greatly varied between the institutions with UCAD ($n = 238$) reporting the largest average class size and ENSA and ISFAR ($n = 37$) tied for the smallest average class size.

Table 1
Demographic Information for the Senegalese Agriculture Professors ($n = 40$)

	UCAD	UGB	UASZ	ENSA	ISFAR
Male	10	4	2	7	12
Female	3	1	0	1	0
Avg. Years Teaching	17	11	5	13	23
Avg. Class Size	238	75	50	37	37

Table 2 provides a summary of the teaching tools/strategies professors reported using to accommodate different learning styles. Approximately 98% ($n = 39$) of the professors indicated that they used hands-on activities or visual aids such as charts, graphs, and maps. Additionally, 95% ($n = 38$) reported using lectures and/or

PowerPoint presentations and approximately 93% ($n = 37$) used discussions in the classroom. Conversely, the four tools/strategies used least were role-play scenarios ($n = 4$), audio lectures ($n = 10$), multi-media presentations ($n = 13$), and oral lecture summaries by students ($n = 17$).

Table 2
Teaching Tools/Strategies Used by the Senegalese Agriculture Professors ($n = 40$)

Teaching Tools	Yes	No	N/A
Hands-on activities	39	1	0
Charts/graphs/maps	39	0	1
Lectures/PowerPoint Presentations	38	1	1
Discussions	37	1	2

Field Trips	29	7	4
Oral lecture summaries by the professor	25	8	7
Using bold colors	24	8	8
Oral lecture summaries by students	17	13	10
Multi-media presentations	13	15	12
Audio lectures	10	19	11
Role-play scenarios	4	21	15

The professors were also asked about what teaching techniques they felt were most effective in facilitating the learning process of students (see Table 3). This allowed for a comparison between techniques frequently used versus those perceived to be the most effective to see if there were any discrepancies. Although none of the techniques received over 50%

agreement, the techniques identified as most effective were lectures/PowerPoint presentations ($n = 19$), group problem solving scenarios ($n = 15$), discussions ($n = 15$), and practical work ($n = 9$). Conversely, techniques that were more student led, such as case studies, group work, and individual research had lower frequencies.

Table 3

Professors' Perceptions on Effective Teaching Strategies (n = 40)

Teaching Techniques	Frequency	Percentage
Lecture/PowerPoint presentations	19	47.5
Problem-solving in groups	15	37.5
Discussions	15	37.5
Practical work	9	22.5
Problem-based learning	4	10.0
Case studies	2	5.0
Mentoring/coaching	2	5.0
Group work	2	5.0
Individual research	2	5.0
Videos and video presentations	1	2.5
Individual research on a topic	1	2.5

At the two training institutes, ENSA and ISFAR, half of the professors ($n = 10$) indicated a lack of equipment and materials (e.g. projectors, microscopes, etc.) as the primary constraint in teaching. Additional constraints mentioned by more than one professor were electricity outages and poor internet connection ($n = 9$), rigid course structure and class schedules ($n = 3$), and

inadequate pedagogical materials ($n = 2$). At UCAD, UGB, and UASZ, more than one professor indicated that the primary constraints in teaching were a lack of adequate materials and resources ($n = 9$) and large class sizes ($n = 8$). Table 4 lists the other constraints identified by the professors that impede on their ability to employ LC instructional strategies.

Table 4

Perceived Constraints in Current Teaching Practices by Institution (n = 40)

Institution	Constraints
University of Cheikh Ants Diop (UCAD)	Large class-sizes Lack of infrastructure (classrooms, lab rooms) Frequent student strikes Inadequate time allocated to teaching Large student populations Shortage of full-time professors Lack of teachers and course evaluations Inefficient student assessment techniques Lack of materials and tools to facilitate teaching and learning Poor internet connection Few pedagogical workshops and trainings on instructional practices
Gaston Berger University (UGB)	Frequent student strike Few materials and tools to facilitate teaching Few field-sites and demonstration plots Lack of infrastructure (classrooms, lab rooms) Few library resources on agricultural sciences Large class-sizes Large student populations Shortage of full-time professors Lack of student participation during courses Lack of pedagogical training workshops and seminars Lack of teaching, lab, and office space Poor internet connection Limited funds to purchase materials
Assane Seck University of Ziguinchor (UASZ)	Frequent student strikes Lack of materials and equipment to facilitate teaching and learning Few available classrooms to teach or conduct LC methods Large class sizes Large student populations Poor internet connection Lack of teacher evaluations Tardy or absent professors
National Advanced School for Agriculture (ENSA)	Teaching time Lack of materials to facilitate teaching and learning Lack of classrooms (Infrastructure is limited) Lack of transportation to field sites Large class sizes Frequent power outages Limited funds to buy resources and materials Shortage of full-time professors

Institute for Advanced Rural and Agricultural Training (ISFAR)	Lack of materials to facilitate teaching and learning Unmotivated students Rigid course structure Resistance of students to LC approaches Lack of available classroom space
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Attitudes toward Learner-Centered Strategies

Approximately 83% of the respondents ($n = 33$) reported that employing different teaching strategies to teach students would be good. Similarly, slightly over half of the professors ($n = 22$) believed that shifting from teacher-centered to learner-centered strategies would be good, and 65% of them ($n = 26$) believed, given the necessary training and support, using different teaching styles in their course would be good. In addition, 80% of professors ($n = 32$) reported that collaborating with other faculty members at their department and institution would be good. However, less than half of the professors believed that changing the way agriculture is taught in their institution ($n = 19$) as well as allowing students to take control and responsibility for their learning ($n = 17$) would be good.

Institutional Environment & Social Climate

The majority of the professors agreed that their university was a good place to work ($n = 28$) and supports efforts from faculty to develop learner-centered strategies ($n = 22$). The respondents were evenly divided on whether or not they felt free to express their opinions about their teaching strategies without worrying about negative results from other faculty members ($n = 20$). However, less than half agreed that the administration discussed innovative teaching techniques ($n = 14$) and felt free to express their opinions about teaching styles to their school's administration without worrying

about negative consequences ($n = 12$). Moreover, some feared repercussions from administrators ($n = 16$) or other faculty members ($n = 12$) for expressing their opinions about teaching strategies. Additionally, less than one-fourth of the professors ($n = 9$) agreed that their school's administration provided them with the resources that are required for developing learner-centered teaching, while about half ($n = 19$) disagreed.

Finally, a majority of the professors ($n = 31$) agreed that their university approval of their teaching strategy is important to them and believed they had control over the decision to use different teaching and learning styles ($n = 21$). Conversely, several professors ($n = 7$) believed it was out of their control. Less than half of the professors ($n = 18$) also reported that designing their teaching and learning styles is entirely up to them, while almost an equal amount ($n = 14$) disagreed. Notwithstanding, only one-third of the professors ($n = 13$) agreed that their institution makes it easy for them to use other teaching styles, while slightly less ($n = 11$) disagreed.

Self-efficacy of Professors in Engaging in LC Strategy

Almost half of the professors indicated limiting perceived behavioral controls as operationalized by self-efficacy. More specifically, approximately 58% of the professors ($n = 23$) agreed that they are confident enough to use more LC instructional strategies in their curriculum, while 40% ($n = 16$) disagreed; and only 31% of the professors ($n = 12$) agreed that they

know enough about LC strategies to implement them in their curriculum, while about 43% disagreed ($n = 17$).

Conclusions, Recommendations & Implications

The purpose of this study was to explore the intentions of Senegalese agriculture professors to engage in LC instructional strategies in an effort to identify opportunities for providing insights on areas of exploration and investment related to international agricultural education and training. The sampling technique used in this study does not allow for the generalization of the following findings and conclusions, but they can be useful as a point of reference in future studies. Similarly, all programmatic recommendations are limited to the sample, but may be considered for implementation in similar settings.

The findings indicated that while many of the professors were incorporating some forms of LC instructional strategies such as hands-on activities and group discussions in their courses, very few of them engaged in less conventional methods like role playing, audio lectures, and use of multimedia. The respondents overwhelmingly indicated they favored employing the traditional TC instructional strategy of lecture with a PowerPoint presentation or other visuals when teaching students, despite seeing the value of LC instructional strategies like independent research studies, group case studies, and mentoring. However, while the professors indicated many favorable beliefs to LC instructional strategies, they also had unfavorable beliefs that impacted their attitudes, subjective norms, and perceived behavioral controls. According to the literature, unfavorable beliefs ultimately decrease the likelihood that they would

employ new instructional strategies, which was evident in the findings.

More specifically, the professors indicated that they grappled with subjective norms due to perceived lack of support for making changes within their institutions. The beliefs that formed these negative subjective norms were a lack of contextual modeling from referent colleagues, systemic issues with inadequate resources and infrastructure, and perceived lack of student compliance. This supports researches that identified inadequate resources as a major challenge in switching to a more LC strategy (Bravo-Ureta et al., 2012). When there are inadequate resources to support instructors in improving their teaching methods, it is easy to revert to the more traditional teaching methods. Additionally, unless these professors perceive that important referents in their institutions and relevant stakeholders are supportive of employing LC instructional strategies, they are less likely to engage in them (Ajzen, 1991, 2012; Underwood, 2012).

In addition, they indicated that although they had a positive self-concept about their teaching, they lacked the self-efficacy required to engage in LC instructional strategies (Magno, 2007), which in turn is due to an actual limiting behavioral control of inadequate training and a lack of skills to implement the strategies. The lack of self-efficacy is particularly significant in Senegalese institutions of higher education because of the hierarchical structure of the African culture, which expects professors to have all the answers, thereby placing an enormous burden on them not to fail (Mashiya, 2011). Therefore, unless Senegalese professors are sure of their capability to implement the LC strategy and have the proper infrastructure and resources, they will not engage in it despite knowing its benefits (Caraway, Tucker, Reinke, & Hall, 2003). It is only in

the presence of such control factors like knowledge, skill, and resources that perceived behavioral control predicts the performance of a behavior (Fishbein & Capella, 2006).

Overall, the findings provide evidence that although these Senegalese professors have positive attitudes toward LC instructional strategies, some cognitive dissonance exists due to challenges with subjective norms and perceived behavioral controls. As a result, the respondents lack the intent to employ new strategies because they are uncertain of the likely outcome and their ability to facilitate the strategies with fidelity. The non-performance of more LC instructional strategies and lack of intent to perform them in the future supports Ajzen's theory that the less favorable one's beliefs about the likely outcome of performing a behavior are, the weaker one's intention of performing such a behavior would be and thus the absence of that behavior (Ajzen, 2012).

Accordingly, we recommend substantive and continuous trainings to increase the fidelity of employing LC instructional strategies within the partner intuitions in order to resolve the cognitive dissonance that exists. Previous studies have shown that first-hand, immersive experiences with other professionals positively impact behavioral beliefs and attitudes about engagement, leading to increased intent to participate (Harder, Lamm, Ganpat, & Linder, 2011; Sewell et al., 2017). These trainings should also improve their self-efficacy as well as their actual behavioral control (skills and knowledge). Moreover, since these findings suggest that these Senegalese professors lack adequate resources that are necessary for employing LC instructional strategies, an added incentive would be to provide instructional resources to the trained professors that make implementing these

strategies more feasible. We believe that with proper training and adequate resources, once the early majority of professors begin to adopt LC instructional strategies, there will be a positive change in subjective norms (Mukembo, Uscanga, Edwards, & Brown, 2017), encouraging the late majority and laggards to also engage in LC instructional strategies (Rogers, 2010; Shelburne et al., 2017).

Finally, we recommend the replication of this project in Senegal and other countries within Africa. We also recommend extending this study to investigate (a) how professors internalize LC instructional strategies, which empower students to take control of their education, in the context of African cultural norms and (b) the degree of influence attitude, subjective norms, and perceived behavioral control has on the intention to employ and actual use of LC instructional strategies in Senegalese classrooms.

The strategies used to train Senegalese agriculture students directly impact the quality of Senegalese agriculture graduates produced, and consequently the development of the Senegalese agricultural industry and the viability of communities that rely on this industry. With the employment of more LC instructional strategies that address the needs of diverse learners, we expect the quality of graduates to improve. However, professors will not engage in these new strategies without proper training and resources. To this end, this line of inquiry has major implications for international agricultural and extension education by way of providing insights concerning areas of exploration and investment by development agencies and NGOs that are interested in implementing capacity building programs.

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