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# Facilitating conditions for farmer learning behaviour in the student-to-farmer university outreach

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## ABSTRACT

**Purpose:** This study elucidates on how faculty supervision support to students during farm placements and other facilitating conditions influence farmer learning in the student-centred university outreach.

**Methodology/Design/Approach:** Cross-sectional data were collected from a sample of 283 farmers who had previously hosted students of Gulu University in the student-to-farmer university outreach. Structural equation modelling was used to analyse how faculty supervision support to students in combination with other facilitating conditions affect the formation of intentions for learning and actual farmer learning behaviour.

**Findings:** Faculty supervision support in the student-to-farmer outreach was found to significantly influence formation of intentions for learning ( $\beta = 0.380$ ;  $t = 5.263$ ;  $P < .01$ ) and actual farmer learning behaviour ( $\beta = 0.182$ ;  $t = 2.081$ ;  $P < .05$ ).

**Practical implications:** Faculty supervision support to students is critical to fostering lasting learning relationships in university outreach. Thus, it needs to be a part of the transformation agenda of the higher education sector for improved community linkages and innovation.

**Theoretical implications:** Empirical data obtained from the context of student-centred university outreach is used to extend the model of facilitating conditions.

**Originality/Value:** The study addresses how faculty supervision support together with farmers' perception of student attitudes and the value of the learning content influence farmers' learning behaviour during university outreach.

## ARTICLE HISTORY



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## 1. Introduction

Higher education systems have witnessed a growing demand for participation in community development work. This is due to the recognition that in pursuit of the knowledge economy agenda, universities are capable of generating and diffusing knowledge for

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local development through community outreach (Cloete and Maassen 2015). However, it has been reported that because of some shortcomings a lot of research results in African universities remain shelved and hardly reach the intended communities (Mirembe, Obaa and Ebanyat 2016).

A well-known example of universities successfully delivering on community outreach objectives is the agricultural land-grant institutions model of the United States of America (Mack and Stolarick 2014). These land-grant institutions reportedly disseminate life-changing knowledge to local communities thereby contributing to socio-economic transformation (Liu 2014). Thus, if African higher education institutions (HEIs) take lessons from the US land-grant institutions model, they may easily spur learning, uptake of innovations, and ultimately improve the quality of community life.

In this regard, African universities have been urged to partner with the private sector and local communities to facilitate inclusive agricultural innovation systems (Regional Universities Forum for Capacity Building in Agriculture (RUFORUM) 2018). For instance, it has been argued that universities are well placed to integrate the excluded and poor people in localized innovation systems in Sub Saharan Africa [SSA] (Halme, Lindeman and Paula 2012). In a broader sense, the innovation system notion is an outcome of the realization of deficiencies in the linear approach of technology transfer. The assumption of this approach is that scientists and change agents would take technologies and innovations to farmers for uptake (Leeuwis and Aarts 2011). However, promising technologies would mostly end up not getting adopted, partly because of a poor fit with the farmers' contexts.

The alternative approach of the innovation systems thinking that consequently emerged demands a discursive space that brings together stakeholders including the scientists, change agents, farmers and other actors to actively engage in problem-solving and contribute to the innovation process (Leeuwis and Aarts 2011). Essentially, this calls for universities to be more proactive if they are to be relevant to community innovation processes. Yet, many universities in SSA still need capacity building in order to take the lead in facilitating the innovation systems. Such universities may seize the opportunity of availability of students for service learning programmes to engage stakeholders including farmers for innovation.

Of late, student-oriented outreach models are increasingly taking root in African universities following successful experimentation in non-African universities such as EARTH University in Costa Rica (Sherrard 2016). For example, in Kenya, Egerton University runs a farm-attachment programme in which students are positioned at commercial farms to gain working experience while providing service to host farmers (Mungai and Njuguna 2016). In Uganda, Makerere University runs a field placement programme for agriculture students that targets student experiential learning while contributing to farmer learning (Opolot et al. 2018). Gulu University (GU) also runs a Student-Centred Outreach Program (SCOP) that offers practical training to students and agricultural extension services to the farming community (Odongo et al. 2017).

In the original design of SCOP (the case for this study), as discussed by Kalule et al. (2016), students upon attachment to an individual farming household were required to commute to and from the farmsteads. Each student was meant to visit an allocated household for at least once a week for a minimum of a year. This restricted the outreach programme operation to a short radius of 10 km from the University campus. In Kalule

and Ongeng's (2016) study, it was further reported that in 2014, following the introduction of graduate training programmes in the Faculty of Agriculture and Environment at GU, the area of coverage for outreach was extended to longer distances of up to 60 km. The reorganization of the SCOP services introduced an alternative approach of community attachment. Particularly, graduate students are attached to farmer groups and other farmer organizations, allowing for a wider reach. The SCOP has reportedly been a success in offering information services (Mugonola and Baliddawa, 2014). However, Roberts and Edwards (2017) observed that some community members were critical of the programme with respect to some of the agricultural information received from the students and inadequate student supervision during field attachment.

In student-centred outreach models, a key facilitating condition is faculty supervision support to students. Notable ingredients of good quality supervision of students include: (1) preparatory meetings between the students and host farmers mediated by university staff; (2) follow-up on student-farmer interactions; and (3) supplementing students' knowledge and complementing student-farmer interactions by university staff. It has been argued that supervision support plays key roles of stimulating, guiding, encouraging and reinforcing learning behaviour (Okorji and Ogbo 2013). It is also important for providing feedback and improving educational outcomes. During the student-farmer interactions, the expectation is that learning would happen for both the students and farmers. However, this study has preferred the side of farmer learning which earlier research has not adequately attended to (Preece 2013; Erickson 2010).

Field supervision support can influence the attitudes exhibited by students during field attachment (Darishah, Daud and Omar 2017). The attitudes could be exhibited in the form of liking farm work, caring for farmers' concerns and overall conduct while on host farms. Consequently, the host-farmers' perceptions of student attitudes together with the perceptions they hold about the value of the learning content can influence the actual learning behaviour. Elsewhere, Cooper, Orrel and Bowden (2010) observed that student field supervision mirroring the above narrative on faculty supervision support faces a myriad of problems. For example, it is costly to manage and laborious for faculty staff.

Most studies on university outreach have been either descriptive or speculative in the analysis (Preece 2013). For instance, Sherrard (2016) and Kalule and Ongeng (2016) majorly concentrated on describing the design and evolution of university outreach while Kalule et al. (2016) and Mungai and Njuguna (2016) focused on processes of community engagement. Similarly, Sherrard and Alvarado (2017) focused on describing success factors of student service-learning programmes. In all, little research attention has been paid to assessing how faculty supervision support to students together with other facilitating conditions influence farmer learning behaviour in the student-to-farmer university outreach. Previous studies applying the facilitating conditions model have tended to rely on the variables of attitudes, supervisor support, perceived value of the learning content and facility (Shuhaiber 2016), which have not been applied to university outreach context. Therefore, this study focused on how faculty supervision support to students during farm placements and other facilitating conditions influence farmer learning in the student-centred university outreach. Insights from this study are useful not only in informing the policy debate on enhancing university-community linkages but also explaining how supervision support affects the learning behaviour of host farmers.

## 2. Theories and hypotheses

The inclusive innovation approach of university outreach is premised on the fact that universities are useful in the development of capabilities of local communities (Kraemer-Mbula and Wamae 2010; Halme, Lindeman, and Paula 2012). In this approach, the interacting actors may include the faculty staff, outreach students, community members and other stakeholders. Such interactive arrangements enhance a discursive space and may enact new forms of collaborative learning for grassroots innovation (Grobelaar, Tijssen and Dijksterhuis 2017). However, this study focuses more on how the interactions between faculty staff and outreach students affect the host farmers' learning behaviour during student farm placements. While the design of the student-centred outreach at GU aimed at spurring community level innovations, the interactive arrangement is largely restricted to faculty staff, students and host farmers thereby excluding other stakeholders and supportive services.

Central to the inclusive innovation notion of university outreach are the following features: (1) drivers of interaction and participation, (2) interface structures, enablers and constraints, and (3) flow of knowledge and skills (Kruss and Gastrow 2015). These features mirror the components of the facilitating conditions framework. Facilitating conditions (FC) refer to enablers or barriers within the learning environment that influence one's perception of ease or difficulty of performing a task (Teo 2010). FC constitute a branch of the theory of interpersonal behaviour advanced by Triandis (1977). Accordingly, the kind of support that learners value may either facilitate or inhibit the learning behaviour. Thus, this study used the theoretical strand of facilitating conditions to assess the role of faculty supervision support to students, student attitudes and perceived value of learning content in farmer learning behaviour during university outreach. As enablers, facilitating conditions may offer social support for interaction and participation thereby eliciting positive behaviour for learning at farm-level (Venkatesh, Thong and Xu 2012; Akbar 2013).

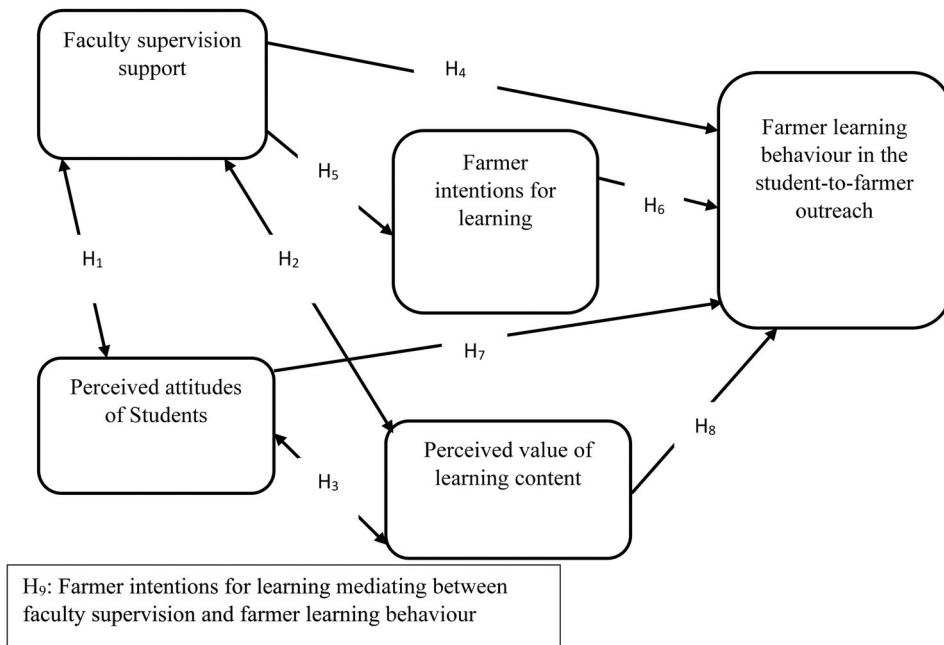
Previous research, mostly in information and communication technology, has shown that faculty supervision support is related to the attitudes exhibited by students during a learning situation (Shuhaiber 2015). Further, the same supervision support has been shown to affect the value that learners attach to the learning content (Akbar 2013). Similar studies in the context of student-to-farmer university outreach are however lacking, necessitating further investigation. It is presupposed that relationships exist between faculty supervision support, perceived student attitudes and perceived value of learning content which combine as facilitating conditions to affect the learning behaviour of host farmers. Therefore, the following hypotheses (summarized in Figure 1) were derived:

H<sub>1</sub>: Faculty supervision support is positively related to farmers' perception of attitudes of students who facilitate learning.

H<sub>2</sub>: Faculty supervision support is positively related to farmers' perception of the value of learning content that the students offer.

H<sub>3</sub>: Farmers' perceived attitudes of students who facilitate learning is positively related to perceived value of learning content.

Learning theories suggest that supervision support helps to fulfil learner needs and to overcome the problems associated with the learning environment (Vieira 2000). It creates a



**Figure 1.** Summary of the hypothesized relationships of facilitating conditions of farmer learning behaviour in the student-to-farmer university outreach.

favourable learning atmosphere, achieving synergy and coordinated efforts to improve education outcomes (Dickson 2011). Based on this theoretical prediction, it can be argued that faculty supervision support to students during university outreach may positively influence farmer learning behaviour. In this study, farmer learning behaviour refers to four key learning activities: (1) seeking information from university students (Wilson 2000), (2) knowledge sharing, i.e. exchange of information, skills or expertise (Hasmath and Hsu 2016), (3) seeking feedback from the students concerning the way they effect learning, and (4) giving feedback to the students regarding what they (students) discuss with farmers.

Research postulates that psychosocial antecedents are mediated by behaviour intentions in predicting outcome behaviours (Ajzen 2002). In this case, behavioural intentions refer to a condition of conscious goal pursuit that is necessary but not sufficient for predicting behaviour. Intentions are assumed to depend on, among other factors, the beliefs that link a given behaviour to certain outcomes and on the perceived social pressure to perform the behaviour (Ajzen 2002). In this study, the formation of farmers' intentions is operationalized as the formulation of plans and intentions to try out the farming competencies gained from students through concrete experience, reflection, analysis, conceptualization and testing. Theories on behavioural intentions predict that the stronger an individual's intent to perform a behaviour, the more likely the individual will engage in that behaviour (Ajzen, Czasch and Flood 2009). Accordingly, the following hypotheses were derived for testing the influence of faculty supervision support through the mediation of formation of intentions on farmer learning behaviours:

H<sub>4</sub>: Faculty supervision support to students during outreach positively influences farmer learning behaviour

H<sub>5</sub>: Faculty supervision support to students during outreach positively influences farmer formation of intentions

H<sub>6</sub>: Farmers' formation of intentions for learning positively influences farmer learning behaviour

Literature on learning shows that attitudes and learning content predict actual learning behaviour (Shuhaiber 2015; Lakhali, Khechine and Pascot 2013). Perceived attitudes about facilitators (for example, liking farm work and good conduct during farm placement) may motivate or inhibit overall behaviours of learners (Shuhaiber 2016). Similarly, perceptions about knowledge or the value of learning content (for instance, learning content on farm practices, postharvest management and produce marketing provided by outreach students) may be an important enabler of learning behaviour (Abu Bakar and Abdul Razak 2014). It remains unclear whether host farmers' perceptions of student attitudes and the value of learning content predict their own learning behaviour in the student-to-farmer university outreach. Thus, the following hypotheses were also derived:

H<sub>7</sub>: Perceived attitudes of students who facilitate learning positively influence farmer learning behaviour

H<sub>8</sub>: Perceived value of learning content delivered by students positively influences farmer learning behaviour

H<sub>9</sub>: Farmers' formation of intentions for learning mediates faculty supervision support in predicting farmer learning behaviour

### 3. Methodology

#### 3.1. Participants

A cross-sectional survey was conducted on a sample of 283 farmers who had previously hosted agricultural students of Gulu University in the outreach programme from 2007 to 2016. Participant farmers were drawn from the sub counties of Paicho and Bungatira (Gulu District) and Koro and Bobi (Omor District). To ensure representativeness, proportional sampling was used to distribute the sample between the selected districts. Outreach programme managers estimated that up to 65% of programme participants were from Gulu District because of the district's proximity to GU. Thus, 181 participants representing 64% (Paicho = 94 and Bungatira = 87) were sampled from Gulu District and 102 representing 36% (Koro = 61 and Bobi = 41) were sampled from Omoro District. Social demographic characteristics of the sample i.e. means (M) and standard deviations (SD) were as follows: experience of household head in hosting university students in years (M = 2.18; SD = 1.99), distance of the household from the university in km (M = 12.60; SD = 8.86), farming experience of household head in years (M = 23.20; SD = 15.15) and age of household head in years (M = 43.41; SD = 13.82). Still in the sample, the education levels of household heads were distributed as follows: no formal education (9.5%), primary

education (56.5%) and post-primary education (33.9%). In terms of gender of household heads, females constituted 35.3% of the sample and the rest were male.

### 3.2. Data sources

Farmer learning behaviour is the dependent variable. It was measured using seven items as adapted from Edmondson (1999) to suit the context of the student-to-farmer university outreach. The items captured the elements of information seeking, knowledge sharing, and giving feedback. A sample item from the domain of information seeking reads as follows: 'I seek information on farming practices from university students'. All items were rated on a 5-point scale (1 = not at all and 5 = always). Farmers' intentions were measured on a scale of four items adapted and modified from Ajzen (2002) and Ajzen, Czasch and Flood (2009). The items were modified following the experiential learning cycle capturing the domains of concrete experience, analysing, conceptualising and testing. A sample item from the construct is: 'I plan to analyse records at my farm to identify any source of success'. The items were rated on a 5-point scale (1 = unlikely and 5 = most likely).

Perceived value of learning content had three items adapted and modified from the Facilitating Conditions Questionnaire (FCQ) of Fraide, Allan and King (2013). A sample item of the construct is: 'I think that learning from university students how to search for marketing information is important to me'. These items were rated on a 5-point scale ranging from 1 = strongly disagree to 5 = strongly agree. Perceived attitudes of students were measured with four items as modified from Ajzen (2002). The items covered the three domains that are commonly used to measure attitudes: behavioural, affective and evaluative. A sample item reads as follows: 'I like the conduct of university students while on my farm'. The items were rated on a 5-point scale (1 = strongly disagree and 5 = strongly agree). Lastly, faculty supervision support was measured using a three-item scale. A sample item is: 'University staff follow up on my interactions with their student(s) on my farm'. The items were also rated on a 5-point scale, ranging from 1 = strongly disagree to 5 = strongly agree.

### 3.3. Data analysis

Data were cleaned and transferred to the SPSS-AMOS version 23 for Structural Equation Modelling (SEM). Unlike other methods of data analysis, for example the Ordinary Least Squares (OLS), SEM is credited for its ability to simultaneously estimate multiple cause-effect inter-relationships among independent, mediating and dependent variables (Mittal and Dhar 2015). The analysis process followed a three-step procedure i.e. data reduction, evaluation of the measurement model and Confirmatory Factor Analysis (CFA) to test for the hypotheses. In the first step, data reduction was done using Exploratory Factor Analysis (EFA) that reduced the number of items for each construct to only those that exhibited the best fit. In the second step, the measurement model was evaluated for the contribution of each item to the construct (latent variables) variance being assessed using factor loadings and Average Variance Extracted (AVE). In the third step, the structural model was tested to determine the strength of the hypothesized relationships between the latent variables.

Diagnostic test results presented in Table 1 show that correlates ranged from weak to only moderate correlation ( $r = 0.031$  to  $r = 0.342$ ), implying the existence of relationships amongst the specified constructs. Since there were no high correlations amongst the constructs, it follows that there was no risk of multicollinearity affecting the sound interpretation of the SEM results as explained in Mittal and Dhar (2015).

Further, indices of composite reliability (CR), an alternative to Cronbach alpha (Mittal and Dhar 2015), were above the minimum threshold of 0.7 for all constructs confirming measurement reliability of the instrument. Similarly, convergent validity was confirmed since the indices of average variance extracted (AVE) and factor loadings (Table 2) exceeded the minimum threshold value of 0.5. Lastly, on the basis of square root values of AVE being greater than the correlates, discriminant validity was confirmed.

## 4. Results and discussion

### 4.1. Confirmatory factor analysis

Results of confirmatory factor analysis presented in Figure 2 show that the Goodness of Fit Index (GFI) = 0.92 (spec.  $\geq 0.90$ ), adjusted GFI (AGFI) = 0.90 (spec.  $\geq 0.90$ ), Tucker-Lewis Index (TLI) = 0.97 (spec.  $\geq 0.95$ ), and the comparative Fit Index (CFI) = 0.98 (spec.  $\geq 0.95$ ) fulfilled the acceptable baseline values. Also, the root mean square error of approximation (RMSEA) at (0.04) was far less than the acceptable maximum value of 0.08 while the ratio of chi-square to degrees of freedom (1.39) was less than the cut-off point of  $\leq 3$ .

Model fit results show that the empirical data fit the specified model of facilitating conditions that explain farmer learning behaviour in the student-to-farmer university outreach well. The R-square value of 0.12 imply that facilitating conditions account for 12% of the total variation in farmer learning behaviour, suggesting that there could be other factors not captured in the model that also explain farmer learning behaviour.

### 4.2. Path analysis

Results of SEM (Table 3) show that a significant relationship exists between faculty supervision support ( $\beta = 0.121$ ;  $t = 4.299$ ;  $P < .01$ ) and farmers' perception of quality of students attitudes.

Similarly, the the relationship between farmers' perception of quality of students attitudes ( $\beta = 0.088$ ;  $t = 4.564$ ;  $P < .01$ ) and perceived value of learning content was significant. There was no significant relationship between faculty supervision support and farmers' perception of the value of learning content ( $\beta = 0.041$ ;  $t = 0.167$ ;  $P > .05$ ). Therefore, the hypotheses of covariance paths were supported for  $H_1$  and  $H_3$  but not  $H_2$ . The results

**Table 1.** Descriptive statistics and correlations of facilitating conditions in university outreach.

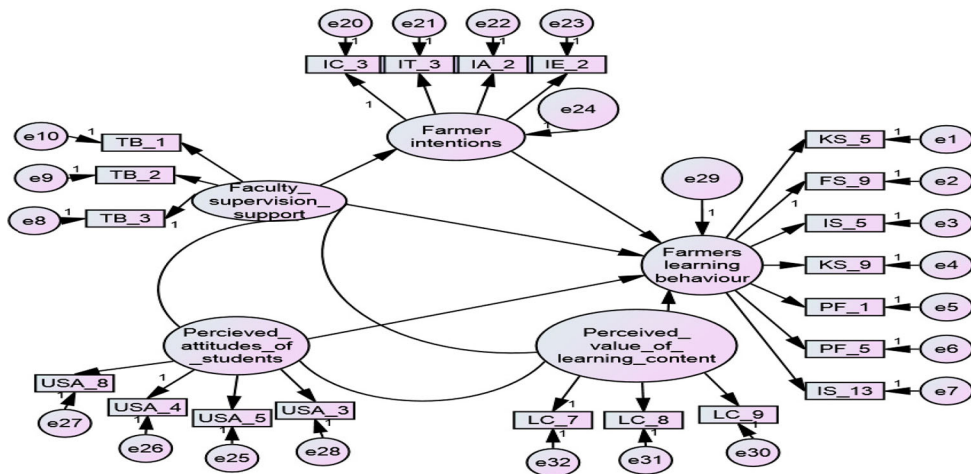
Variable	Mean	SD	CR	AVE	1	2	3	4	5
1. Perceived value of learning content	4.717	.502	.993	.716	.846 <sup>a</sup>				
2. Perceived attitudes of students	4.651	.491	.996	.627	.320	.792 <sup>a</sup>			
3. Faculty supervision support	4.271	.733	.986	.649	.092	.305	.806 <sup>a</sup>		
4. Farmers' formation of intentions	4.225	.837	.817	.650	.031	.104	.342	.806 <sup>a</sup>	
5. Farmers' learning behaviour	3.992	.860	.934	.529	.053	.173	.260	.283	.727 <sup>a</sup>

Note: Values on the diagonal with superscript 'a' =  $\sqrt{AVE}$ .

**Table 2.** Estimates of factor loadings.

Item	Factor loadings			
	FLB	FI	PVLC	PAS
I seek information on farming practices from university students (IS_5)	.667			
I seek information on produce marketing from university students (IS_13)	.684			
I share knowledge on new ideas of farming practices with university students (KS_5)	.732			
I share knowledge on postharvest handling with university students (KS_9)	.712			
I seek feedback on produce postharvest handling from university students (FS_9)	.793			
I give feedback on farming business plans to university students (PF_1)	.759			
I give feedback on new ideas of farming practices to university students (PF_5)	.737			
I plan to take records of farming activities on my farm (IE_2)		.697		
I plan to analyse records at my farm to identify any sources of success (IA_2)		.839		
I plan to think through records at my farm on what has gone well in the previous year (IC_3)		.874		
I will try to use records on my farm for making future decisions (IT_3)		.805		
I think that learning from university students how to search for marketing information is important to me (LC_7)			.936	
I think that learning knowledge on negotiation with product buyers from university students is important to me (LC_8)			.853	
I think that learning knowledge on how to position my farm produce for the market from university students is important to me (LC_9)			.737	
Generally speaking, university students are good listeners to the farming challenges we experience (USA_3)				.695
I like the university students' farm work skills (USA_4)				.838
I like the conduct of university students while on my farm (USA_5)				.847
The conduct of university students while on the farm is valuable (USA_8)				.778
University staff make appropriate preparations for me to learn from their students (TB_1)				.615
University staff make follow ups on farmers' interactions with students on the farm (TB_2)				.881
University staff supplement the knowledge farmers learn from students (TB_3)				.891

Notes: Where FLB = farmers' learning behaviour; FI = farmers formation of intentions, PAS = perceived student attitudes, PVLC = perceived value of learning content; FSS = faculty supervision support.



Goodness-of-fit indices: Chi-sq = 251.1; df = 181; chi-sq/df = 1.39; GFI = 0.92; AGFI = 0.90; TLI = 0.97; CFI = 0.98; RMSEA = 0.04; R-Square = .12. Variable acronyms (e.g. KS\_5) are described in Table 2.

**Figure 2.** Facilitating conditions for farmer learning behaviour in the student-to-farmer university outreach.

**Table 3.** Hypotheses testing of factors predicting farmers' learning behaviour.

Path	Path Est. $\beta$ (S.E.)	t-value	Hypothesis testing decision
<b>Co-variance estimates</b>			
Faculty supervision support $\leftrightarrow$ Perceived student attitudes	.121(.028)	4.299**	Supported
Perceived student attitudes $\leftrightarrow$ Perc. value of L. Content	.088(.019)	4.564**	Supported
Faculty supervision support $\leftrightarrow$ Perc. value of L. Content	.041(.030)	0.167	Not supported
<b>Regression estimates</b>			
Faculty supervision support $\leftrightarrow$ Farmers' form. of intentions	.380 (.072)	5.263**	Supported
Faculty supervision support $\leftrightarrow$ Farmers' learn. behaviour	.182 (.087)	2.081*	Supported
Farmers' form. of intentions $\leftrightarrow$ Farmers' learn. behaviour	.234 (.075)	3.089**	Supported
Perc. Value of L. Content $\leftrightarrow$ Farmers' learn. behaviour	-.001 (.114)	-0.011	Not supported
Perceived student attitudes $\leftrightarrow$ Farmers' learn. behaviour	.196 (.138)	1.417	Not supported

Note: \*\* =  $P < .01$ ; and \* =  $P < .05$ .

mean that an increase in the variance of faculty supervision support enhances farmers' perceptions of student attitudes, just like the increase in the variance of student attitudes improve covariance in the perceived value of learning content. Previous research has shown that supervision support positively affects emotions, attitudes and mental preparation of students for field work (Anorico 2019). Similarly, the finding on the relationship between students' attitudes and the value of content is reinforced by the study by Darishah et al. (2017) who reported that students' attitudes were positively associated with the content of learning (i.e. knowledge, interpersonal skills and technical skills). It can be argued that in pursuit of farmer learning, faculty supervision support and students' attitudes cannot be delinked from each other. Again, students' attitudes cannot be separated from farmers' perception of the value of learning content that these students deliver.

Regression results revealed that faculty supervision support ( $\beta = 0.182$ ;  $t = 2.081$ ;  $P < .05$ ) significantly predicts farmer learning behaviour, supporting hypothesis H<sub>4</sub>. Likewise, faculty supervision support ( $\beta = 0.380$ ;  $t = 5.263$ ;  $P < .01$ ) significantly predicts farmers' formation of intentions for learning, and at the same time, farmers' formation of intentions ( $\beta = 0.234$ ;  $t = 3.089$ ;  $P < .01$ ) significantly predicts farmer learning behaviour. The last two findings support hypotheses H<sub>5</sub> and H<sub>6</sub>, respectively. The results are corroborated by previous research on supervision support such as Cooper, Orrel and Bowden (2010) and Ram (2008) who both reported the existence of a positive relationship between supervision support and learning. It has been reported that intentions are good predictors of behaviour (Evers and Sieverding 2015). Generally, the extant literature on student community engagement supports the view that supervision is important not only for the educational outcomes of the students but also for community learning. Examples of such studies include Emslie (2010) and Erickson (2010) which assert that supervision support by university field educators is critical for active engagement of the students with host-communities.

On a contrasting note, neither perceived value of learning content ( $\beta = -0.001$ ;  $t = -0.011$ ;  $P > .05$ ) nor perceived attitudes of students ( $\beta = 0.196$ ;  $t = 1.417$ ;  $P > .05$ ) significantly predicted farmer learning behaviour. Hence, hypotheses H<sub>7</sub> and H<sub>8</sub> were not supported. This was surprising and contradicted other studies which established that host-communities of student outreach tend to consider that these students possess state-of-the-art knowledge which can be utilized to improve learning and adaptation of innovations (Rothman 2007; Shuda and Kearns-Sixsmith 2009). Farmers in the study area

have hosted students for a long time and it is probable that this could have made them familiar with students' knowledge. In turn, perceived students' attitudes, a major covariate of perceived value of learning content, also emerged as a non-significant predictor of farmers' learning behaviour. Nevertheless, further research on the two constructs in a different study context could help to resolve the inconclusiveness of these findings.

Bootstrapping results (Table 4) indicate that the mediation effect of farmers' formation of intentions ( $\beta = 0.075$ ; 95% CI = 0.027~0.153) between faculty supervision support and farmer learning behaviour ( $H_9$ ) was significantly different from zero. Accordingly, hypothesis  $H_9$  on mediation was supported.

In social science related research, it is important to evaluate effect sizes alongside coefficients for practical relevance. It has been suggested that for results to be practically meaningful, the effect sizes should be  $\beta = 0.2$  or greater (Medina 2017; Ferguson 2009). In this study, the biggest standardized total effects were found in the prediction relationship between faculty supervision support ( $\beta = 0.342$ ; 95% CI = 0.211~0.463; hypothesis  $H_5$ ) and farmers' formation of intentions. This finding meets the criterion of practical relevance. The estimate (0.342) implies that faculty supervision support predicts up to 34.2% of variance in farmers' formation of intentions. This implies that if universities are to achieve meaningful farmer learning during outreach, they need to focus more attention on influencing farmers' formation of intentions. Relatedly, the prediction relationship between faculty supervision support and farmer learning behaviour ( $\beta = 0.229$ ; 95% CI = -0.013~0.312; hypothesis  $H_4$ ) satisfied the criterion of practical relevance. Lastly, farmers' formation of intentions and farmer learning behaviour ( $\beta = 0.220$ , 95% CI = 0.066~0.389; hypothesis  $H_6$ ) also met the criterion of practical relevance. Overall, the findings on effect sizes were small suggesting a possibility of some other factors not covered in this study that affect farmer learning behaviour during outreach.

## 5. Conclusion and recommendations

In this study, we have established that faculty supervision support to students is significantly related to farmers' perception of attitudes of students. In turn, perceived attitudes of students are also significantly related to perceived value of the learning content. Faculty supervision support significantly predicts both farmers' formation of intentions and learning behaviour. It suffices to conclude that in the student-to-farmer university outreach, faculty supervision support is an important factor influencing farmers' formation of intentions and learning behaviour. This supervision support is also connected to farmers' perceptions of student attitudes, and in the same way, perceived student attitudes are linked to farmers' perceptions of the value of learning content from the students.

**Table 4.** Bootstrapping for mediation test.

Path	Standardized effects			Bias-corrected (95% CI)	
	Direct	Indirect	Total	Lower bound	Upper bound
Fac. supervision $\leftrightarrow$ Farmers' learning behav.	0.154	0.075	0.229	-0.013	0.312
Fac. supervision $\leftrightarrow$ Farmers' intentions	0.342	-	0.342	0.211	0.463
Farmers' intention $\leftrightarrow$ Farmers' learning behav.	0.220	-	0.220	0.066	0.389
Faculty sup. $\leftrightarrow$ Farmers' intentions $\leftrightarrow$ Farmers' learn behav.	-	0.075	0.075	0.027	0.153

From a theoretical perspective, the study has integrated farmer intentions and learning behaviour into the facilitating conditions model and shows that faculty supervision support predicts the former two variables. A key practical implication for policy is that faculty supervision support is critical for fostering lasting learning relationships in the student-to-farmer university outreach. Thus, faculty supervision support to student during field attachment needs to be part of the transformation agenda of the higher education sector for improved community linkages and innovation. This could be achieved through capacity building and refresher training to faculty staff as well as provision of more support to outreach programmes to effectively support students while facilitating discursive spaces for improved community innovation. Future research on the student-to-farmer university outreach should assess how resource availability, farmers' motivation and social factors influence farmer learning.

## 6. Study limitations

Some participants in the study area hosted graduate students while others hosted undergraduate students. These differences were not analysed in this study. Therefore, the results need to be applied with caution to situations of monolithic systems of student community attachment.

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## References

- Abu Bakar, A., and F. Z. B. Abdul Razak. 2014. "The Role of Facilitating Condition and Social Influence Towards Continuance Intention to Use E-Learning." *Journal of Technical Research and Applications* 2 (1): 12–14.
- Ajzen, I. 2002. "Residual Effects of Past on Later Behaviour: Habituation and Reasoned Action Perspectives." *Personality and Social Psychology Review* 6: 107–122.
- Ajzen, I., C. Czasch, and M. G. Flood. 2009. "From Intentions to Behaviour: Implementation Intention, Commitment, and Conscientiousness." *Journal of Applied Social Psychology* 39 (6): 1356–1372.
- Akbar, F. 2013. "What Affects Students' Acceptance and Use of Technology?" Thesis, Dietrich College. <http://repository.cmd.edu/hsshonors/179>.
- Anorico, H. C. 2019. "Service-learning in the Philippines: The University of Santo Thomas' National Service Training Program." *Gateways: International Journal of Community Research and Engagement* 12 (1), doi:10.5130/ijcre.v12i1.5944.
- Cloete, N., and P. Maassen. 2015. *Roles of Universities and the African Context. Knowledge Production and Contradictory Functions in African Higher Education*. ViewPoint, Cape Town: 2015 African Minds. <https://chet.org.za/download/file/fid/840>.
- Cooper, L., J. Orrell, and M. Bowden. 2010. *Work Integrated Learning: A Guide to Effective Practice*. London: Routledge.
- Darishah, P., Y. Daud, and F. M. S. Omar. 2017. "Teaching and Learning Supervision by School Management, Attitudes of Teachers and Competency of Teaching." *International Journal of Development and Sustainability* 6 (10): 1367–1381.
- Dickson, A. 2011. The State of Supervision of Teaching and Learning in Public Junior High Schools in Ghana: A Case Study of Selected Junior High Schools in Sekyere East District of Ashanti Region." Master's thesis, Kwame Nkrumah University of Science and Technology.
- Edmondson, A. 1999. "Psychological Safety and Learning Behavior in Work Teams." *Administrative Science Quarterly* 44 (2): 350–383.
- Emslie, M. 2010. "Out of the Too Hard Basket: Promoting Student's Safety in Cooperative Education." *Asia-Pacific Journal of Cooperative Education* 11 (2): 39–46.
- Erickson, M. S. 2010. *Investigating Community Impacts of a University Outreach Program Through the Lens of Service-Learning and Community Engagement*. Doctoral Dissertation, . Iowa: Iowa State University.
- Evers, A., and M. Sieverding. 2015. "Academic Career Intention Beyond the PhD: Can the Theory of Planned Behavior Explain Gender Differences?" *Journal of Applied Social Psychology* 45: 158–172.
- Ferguson, C. J. 2009. "An Effect Size Primer: A Guide for Clinicians and Researchers." *Professional Psychology: Research and Practice* 40 (5): 532–538. doi:10.1037/a0015808.
- Fraide, A. G. J., B. I. B. Allan, and R. B. King. 2013. "Adapting the Facilitating Conditions Questionnaire (FCQ) for Bilingual Filipino Adolescents: Validating English and Filipino Versions." *Child Indicators Research* 6: 237–256.
- Grobbelaar, S., R. Tijssen, and M. Dijksterhuis. 2017. "University Driven Inclusive Innovations in the Western Cape of South Africa: Towards a Research Framework of Innovation Regimes." *African Journal of Science, Technology, Innovation and Development* 9 (1): 7–19. doi:10.1080/20421338.2016.1225549.
- Halme, M., S. Lindeman, and L. Paula. 2012. "Innovation for Inclusive Business: Intrapreneurial Bricolage in Multinational Corporations." *Journal of Management Studies* 49: 743–784. doi:10.1111/j.1467-6486.2012.01045.x.

- Hasmath, R., and J. Y. J. Hsu. 2016. "Communities of Practice and the NGO Sector in China." International Society for Third Sector Research Conference, Stockholm, Sweden.
- Kalule, W. S., W. Odongo, K. E. Kule, K. E. Ndyomugenyi, P. Omara, and D. Ongeng. 2016. "Conceptualizing the Student-Centred Outreach Model for Experiential Learning and Community Transformation." *African Journal of Rural Development* 1 (3): 219–227.
- Kalule, W. S., and D. Ongeng. 2016. "Embedding Community Engagement in University Training Curricula: Experiences from Gulu University in Uganda." *RUFORUM Working Document Series* 14 (1): 409–413.
- Kraemer-Mbula, E., and W. Wamae. 2010. "Adapting the Innovation Systems Framework to Sub-Saharan Africa." In *Innovation and the Development Agenda*, edited by Erika Kraemer-Mbula and Watu Wamae, 65–90. Ottawa, ON: Organisation for Economic Co-operation and Development.
- Kruss, G., and M. Gastrow. 2015. *Linking University and Marginalised Communities. Discussion Paper*. Cape Town: Human Sciences Research Council.
- Lakhal, S., H. Khechine, and D. Pascot. 2013. "Student Behavioural Intentions to Use Desktop Video Conferencing in a Distance Course: Integration of Autonomy to the UTAUT Model." *Journal of Computing in Higher Education* 25 (2): 93–121. doi:10.1007/s12528-013-9069-3.
- Leeuwis, C., and N. Aarts. 2011. "Rethinking Communication in Innovation Processes: Creating Space for Change in Complex Systems." *The Journal of Agricultural Education and Extension* 17 (1): 21–36.
- Liu, L. 2014. *Spillovers from Universities: Evidence from the Land-Grant Program*. Los Angeles: University of Southern California.
- Mack, E. A., and K. Stolarick. 2014. "The Gift That Keeps on Giving: Land-Grant Universities and Regional Prosperity." *Environment and Planning C: Government and Policy* 32: 384–404. doi:10.1068/c11164r.
- Medina, M. N. 2017. "Training Motivation and Satisfaction: The Role of Goal Orientation and Offshoring Perception." *Personality and Individual Differences* 105: 287–293.
- Mirembe, D. P., B. B. Obaa, and P. Ebanyat. 2016. "Developing and Piloting a Multi-Channel ICT-Enabled Model to Enhance University Engagement with Smallholder Farming Communities in Uganda." *African Journal of Rural Development* 1 (1): 13–21.
- Mittal, S., and R. L. Dhar. 2015. "Transformational Leadership and Employee Creativity: Mediating Role of Creative Self-efficacy and Moderating Role of Knowledge Sharing." *Management Decision* 53 (5): 894–910. doi:10.1108/MD-07-2014-0464.
- Mugonola, B., and C. Baliddawa. 2014. "Building Capacity of Smallholder Farmers in Agribusiness and Entrepreneurship Skills in Northern Uganda." *Agricultural Information Worldwide* 6 (1): 122–126.
- Mungai, N., and W. Njuguna. 2016. "Linking Universities to Communities: The Case of Egerton University." *RUFORUM Working Document Series* 14 (1): 415–420.
- Odongo, W., W. S. Kalule, K. E. Kule, E. K. Ndyomugenyi, P. Omara, and D. Ongeng. 2017. "Responsiveness of Agricultural Training Curricula in African Universities to Labour Market Needs: The Case of Gulu University in Uganda." *African Journal of Rural Development* 2 (1): 67–76.
- Okorji, P. N., and R. N. Ogbo. 2013. "Effects of Modified Clinical Supervision on Teacher Instructional Performance." *Journal of Emerging Trends in Educational Research and Policy Studies* 4: 901–905.
- Opolot, H. N., P. Isubikalu, B. B. Obaa, and P. Ebanyat. 2018. "Influence of University Entrepreneurship Training on Farmers Competences for Improved Productivity and Market Access in Uganda." *Cogent Food & Agriculture*, doi:10.1080/23311932.2018.1469211.
- Preece, J. 2013. "Service Learning and Community Engagement in South African Universities: Towards an 'Adaptive Engagement' Approach." *Alternation Special Edition* 9: 265–291.
- Ram, S. 2008. "Industry-based Learning and Variable Standards in Workplace Assessments." *Asia-Pacific Journal of Cooperative Education* 9 (2): 129–139.
- Regional Universities Forum for Capacity Building Agriculture (RUFORUM). 2018. The Sixth African Higher Education Week and RUFORUM Biennial Conference." <https://repository.ruforum.org/>

[rurforum.org/documents/sixth-african-higher-education-week-and-rurforum-biennial-conference-2018-summary](http://rurforum.org/documents/sixth-african-higher-education-week-and-rurforum-biennial-conference-2018-summary).

- Roberts, R., and M. C. Edwards. 2017. "Challenges to Sustaining University-Community Partnerships in War-Torn, Northern Uganda: Investigating Resistance, Negative Stereotyping, and Gender Bias in Agricultural Students' Attachments." *Journal of International Agricultural and Extension Education* 24 (2): 4–21. doi:10.5191/jiaee.2017.24201.
- Rothman, M. 2007. "Lessons Learned: Advice to Employers from Interns." *Journal of Education for Business* 82 (3): 140–144.
- Sherrard, D. 2016. "Linking Universities to Communities: The Case of EARTH University." *RUFORUM Working Document Series* 14 (1): 403–407.
- Sherrard, D., and I. Alvarado. 2017. "Entrepreneurship Education in Agriculture: The EARTH University Approach." *African Journal of Rural Development* 2 (2): 153–160.
- Shuda, J., and D. Kearns-Sixsmith. 2009. "Outreach: Empowering Students and Teachers to Fish Outside the Box." *Zebrafish* 6 (2): 133–138.
- Shuhaiber, A. H. 2015. "'Students' Willingness to Accept Virtual Lecturing Systems: An Empirical Study by Extending the UTAUT Model." *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering* 9 (4): 1153–1157.
- Shuhaiber, A. 2016. "How Facilitating Conditions Impact Students' Intention to Use Virtual Lectures? An Empirical Evidence." The Twelfth Advanced International Conference on Telecommunications, 68–75, Valencia, Spain, May 22–26. Amman, Jordan: University of Jordan.
- Teo, T. 2010. "Examining the Influence of Subjective Norm and Facilitating Conditions on the Intention to Use Technology among Pre-Service Teachers: A Structural Equation Modelling of an Extended Technology Acceptance Model." *Asia Pacific Education Review* 11: 253–262.
- Triandis, H. C. 1977. *Interpersonal Behaviour*. Monterey, CA: Brooks/Cole.
- Venkatesh, V., J. Y. L. Thong, and X. Xu. 2012. "Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology." *MIS Quarterly* 36 (1): 157–178.
- Vieira, F. 2000. "The Role of Instructional Supervision in the Development of Language Pedagogy." *Mélanges CRAPEL* 25: 31–40.
- Wilson, T. D. 2000. "Human Information Behaviour." *Informing Science* 3 (2): 49–55.