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Social cognitive drivers of farmer learning behaviour in the student-to-farmer university outreach in Uganda

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Globally, universities are repositioning themselves for community outreach although with difficulty in responding to the unpredictable social features of host communities. Accordingly, this study aims to assess the role of social cognitive factors in farmer learning behaviour during university outreach. Structural equation modelling was conducted on the data obtained from a sample of 283 host participants of the student outreach programme of Gulu University, Uganda. The results indicate that social outcome expectations ($\beta = 0.227$, $t = 1.978$, $P < 0.05$), social influence ($\beta = .372$, $t = 4.448$, $P < 0.01$) and farmers' formation of intentions ($\beta = .214$, $t = 3.254$, $P < 0.01$) significantly predict farmer learning behaviour. It is also established that social influence combine with formation of intentions to mediate social outcome expectations in predicting farmer learning behaviour. We highlight that tapping into the social setting of host farmers is critical for the success of university outreach in the sense that it generates the social reinforcements for effective farmer participation and learning. We recommend that the managers of university outreach programmes should devote efforts to prepare students to be sensitive to the concerns and needs of the community as a whole rather than just the host farmers.

Keywords: higher education, community linkages, outcome expectations, social influence

Introduction

Recent deliberations on university–community linkages have increasingly urged higher education institutions (HEIs) to play an active role in promoting socio-economic transformation (Jacob et al. 2015; Nakayiwa et al. 2016). This development is a result of the realization that countries, such as China and India, which adequately exploited their knowledge-economy, have registered tremendous development over time (Cloete et al. 2011). However, in sub-Saharan Africa (SSA), the situation is different as evidenced by limited university engagement of communities to promote learning and innovation. Most universities in SSA have barely taken advantage of the vast resources within their reach, particularly the researched knowledge, technologies and innovations as well as the human resources to advance the transformation agenda (Cloete and Maassen 2015). This in part is blamed on poorly developed outreach functions. For instance, it has been suggested that in many African universities, outreach functions appear to be managed as an afterthought rather than a key mandate (Jacob et al. 2015). This scenario implies that in African universities, community outreach is not well prioritized right from the administration to faculty and student levels (Muriisa 2015). Consequently, the engagement of knowledge users who are meant to be served by the knowledge generated in universities is limited.

Nevertheless, many African universities, especially those involved in agricultural research and training, are repositioning themselves for improved community outreach as a strategy of pursuing more societal relevance (Nampala, Kityo, and Adipala 2016). These universities seem to be motivated by the belief that partnership with the community can usher in a new model of agricultural extension that exploits farmer social cognitions for learning and innovation at the grassroots (Sewell et al. 2017). Even then, there are notable differences in the way universities engage communities. For instance, Kraemer-Mbula (2014) illustrated that the science and technology universities are less likely to engage in community outreach when compared to community-based universities. The Kraemer-Mbula study (2014) further articulated that even within a given university, some faculties and departments tend to participate in community outreach activities more than others. In this regard, the departments of agriculture, environmental science, social work and health are more likely to be active in community development work than that of the disciplines of engineering. This pattern of orientation is not any different when viewed from the perspective of student outreach activities. As an example, agriculture students tend to engage in outreach activities more than those from technical and engineering disciplines (Kraemer-Mbula 2014), a fact that may explain the rise in student-centred outreach approaches in agricultural-leaning universities.

Student-centred outreach models appear well suited for addressing local development needs, an aspect that African universities can easily perform (Kruss and Gastrow 2015; Grobbelaar, Tijssen, and Dijksterhuis 2017) rather than partnerships with firms, which is the case for universities in developed countries (Kruss, Adeoti, and Nabudere 2012). Accordingly, if African universities adopt or strengthen student-centred outreach activities, such universities will most likely have an edge in championing localized innovation systems as articulated by Lundvall et al. (2009). Examples of student outreach activities are commonly cited in South African universities where these activities are implemented as service learning programmes (Grobbelaar, Tijssen, and Dijksterhuis 2017). In the East African region, student-

oriented outreach activities have emerged as an option that complements the traditional approach of staff community outreach. Prominent among these universities is Gulu University (GU) in Uganda that runs the student-centred outreach (SCO), which involves undergraduate and graduates in communities to offer services to farming households (Kalule and Ongeng 2016). Other active universities implementing student-oriented outreach include Egerton University in Kenya (Mungai and Njuguna 2016) and Makerere University in Uganda (Opolot et al. 2018).

Essentially, the SCO strategy of GU was designed to create farmer learning within the community that neighbours the university campus through knowledge and experience sharing with the hosted students (Odongo et al. 2017). Further, the Kalule et al. (2016) study explained the core features of the SCO including: (1) Students interact with farmers to facilitate learning; (2) Farmers participate in problem communication and knowledge sharing with students; (3) Students transmit identified farming problems to the faculty; (4) Students return and share the researched solutions to the community. Existing studies on the SCO approach of GU are generally characterized by mixed results; yet, these studies are mostly qualitative in nature. The study of Mugonola and Baliddawa (2014), for instance, reported that this outreach approach had registered success in delivering experiential learning to both the students and host farmers. Conversely, Roberts and Edwards (2017) contended that the partnerships-building between the staff and students of GU on the one part and the host-communities on the other was still limited. This deficiency was blamed on the fact that the managers of the SCO while delivering outreach services seemed not to pay adequate attention to the social context of the host farmers. The Roberts and Edwards (2017) study also suggested that farmers seemed to have negative stereotypes about student outreach activities and that this was likely to be affecting these farmers' learning behaviour towards the outreach programme of GU. Thus, the SCO may have fallen short of responding to the features of the social cognitive environment in which the host farmers are embedded. Such a problem has far-reaching implications for the SCO of GU and other universities in Africa. Notably, it may be affecting the long-term strategy of catalyzing sustainable learning relationships in the SCO.

The literature on the application of social cognitive theory (SCT) is largely rich in the fields of health and physical activity (Scullin, Le, and Shelton 2017), social marketing (Chin and Mansori 2018) as well as the learning behaviours amongst students (Marx, Simonsen, and Kitchel 2014). Even then, De Snoo et al. (2013) stressed that as much as socio-psychological factors are known to predict human behaviour, the influence of these factors is not fixed. Instead, their predictive role varies depending on the psychology of individuals, the behaviour under question and the study context. In all, a clear knowledge gap exists on how the constructs of social outcome expectations and social influence (components of the SCT) affect farmer learning behaviour in the student-to-farmer university outreach. The results of this study are insightful in explaining how the social cognitive

environment of the host farmers of student outreach activities can be better harnessed to ensure lasting learning relationships and sustainable university–community linkages.

Theories and formulation of hypotheses

Student-to-farmer university outreach targets creating farmer learning in which the influence of the social environment on farmer cognitions cannot be ruled out. In this regard, SCT advanced by Bandura (1977) seems well-suited for this study context. SCT is concerned with human behavioural functioning and particularly how people, such as smallholder farmers in student-to-farmer university outreach, acquire and maintain knowledge, skills and beliefs through their interactions with others (Sewell et al. 2017). The central notion of SCT is maintaining a certain favourable behaviour, as every newly cultivated behaviour faces the risk of relapsing if it is not properly practised (Chin and Mansori 2018). According to Bandura (1989), SCT explains reciprocal interacting influences amongst (1) personal factors, ranging from thoughts, beliefs, skills and affection, (2) behaviours (for example, farmer learning) and (3) the environment (for instance, social influence). It also explains that people's perceptions, beliefs, self-confidence and outcome expectations determine their abilities to perform a behaviour in question (Bandura 1982). Personal factors, particularly cognitive beliefs, play an important role in people's capability to perceive a situation, construct the reality and execute behaviours (Anderson et al. 2006). Environmental influences are seen as factors that are physically external to a person that provide opportunities and social support, determining superior performances (Bandura 1989).

A key sub-theory of SCT is cognitive-based expectations (Chlebowy and Garvin 2006). Bandura (1982) argued that two types of cognitive-based expectations influence human behaviour: self-efficacy expectations and outcome expectations. The construct of self-efficacy expectations (SE) relates to the self-confidence one holds in carrying out a behaviour and can be defined as the conviction that one can successfully execute the required behaviour to produce the desired outcomes (Anderson et al. 2006). The concern of SE is the linkage between self-perceptions and individual actions (Chlebowy and Garvin 2006). Given the fact that farmers normally form judgmental groups that play a critical role in learning and technology uptake decisions (De Snoo et al. 2013), SE may not adequately interrogate farmer behaviours in the SCO. It, therefore, follows that outcome expectations, linked to social phenomena and concerned with the beliefs that certain behaviours will lead to certain socially desired outcomes (Bandura 1977), may be more appropriate. As an example, a host farmer may be encouraged to participate and learn from university outreach activities if he or she thinks that peer farmers approve that such participation is likely to be mutually beneficial to members of the community. These social outcome expectations may either be supportive or not that participation in university outreach can result in improved farm yields, better quality farm produce or farm incomes. Hence, social outcome expectations, as the beliefs about the expected social reactions

(Hall et al. 2012) from others, for instance, members of the farmer group, have been preferred in this study.

Social outcome expectations could be an important factor that universities may want to exploit in the processes of curricula reviews that bring students training closer to farming communities. If such curricula prepare students to be responsive to the social concerns of the community as a whole, then the students will deliver better outreach services to farming communities. Accordingly, this study is premised on the assumption that social outcome expectations of the host farmers of university outreach may be affecting these farmers' learning behaviours with far-reaching implications for the sustainability of university-community linkages.

Empirical research has shown that social outcome expectations is an important construct in predicting behaviour. Examples of research areas in which this construct has been applied include nutrition and physical activity (Dewar et al. 2012), career decision-making amongst college students (Marx, Simonsen, and Kitchel 2014) and health studies (Hall et al. 2012). However, the application of social outcome expectations in farmer learning behaviour, specifically in the context of student-to-farmer university outreach, is still lacking, necessitating further research. In this study, social outcome expectation is operationalized as the expectation of positive social reactions by the host farmers for their participation in student-to-farmer university outreach.

A second sub-theory of SCT is the environment of the learner, comprising the physical environment (e.g., infrastructure and soils) and the social environment (e.g., family members, farmers' group(s) and the broader community) (Slater 1989). University outreach similar to that of GU may be more concerned with the notion of social environment, which presents social pressures on farmers while interacting with students (De Snoo et al. 2013). Thus, the current study prefers to concentrate on the social environment of the farmer because it is insightful for farmer learning and innovation if appropriately exploited as stressed by Sewell et al. (2017). Within the broad framework of the social environment of SCT, it has been argued that social influence, either internal or external, offers social reinforcements in the process of executing and maintaining a learning behaviour (Naslund et al. 2017; Scullin, Le, and Shelton 2017).

Previous research has demonstrated that social influence is an important factor in explaining the behaviour in career decision-making (Gushue and Whitson 2006) and behaviour towards the adoption of information and communication technologies amongst farmers (Yang et al. 2012). Central to the construct of social influence is the concept of subjective norms, which Ajzen (1991) defined as the degree to which one feels that 'significant others', also known as social referents, think they should perform a behaviour. The theory on 'significant others' emphasizes farmers' desires to comply with the norms of that particular social category, for instance, a farmers' group. Farmers, in their communities, are known to constantly compare themselves against each other's performances (De Snoo et al. 2010). Therefore, it is possible that the 'significant others' may be bringing social

reinforcements to farmer learning behaviour during university outreach through social persuasion or encouragement as articulated by Ajzen (1991). Thus, the construct of social influence was further tested in the context of student-to-farmer university outreach to ascertain its role in farmer learning behaviour. In this study, therefore, social influence is operationalized as the social persuasion and encouragement of an individual host farmer by peers (and 'significant others') that the participation in student-to-farmer university outreach will result in improved farm yields, quality of farm products and farm incomes. The 'significant others' are presumed to be members of farmers' groups, the community, and the people whose opinion is valued by the individual host farmers in question.

A host of behaviour research postulates that psychosocial antecedents are mediated by behaviour intentions in predicting outcome behaviours (Ajzen 1991). In this case, behavioural intentions refer to a condition of conscious goal pursuit that is necessary but not sufficient for predicting behaviour (Ajzen 2012). Intentions are assumed to depend, among other factors, on the beliefs that link a given behaviour to certain outcomes and on the perceived social pressure to perform the behaviour (Menozzi, Fioravanzi, and Donati 2015). In this study, farmers' formation of intentions is operationalized as the formulation of plans and intention to try out the farming competencies gained from students through the experiential learning cycle of concrete experience, reflecting, analyzing, conceptualizing 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). Lastly, farmer learning behaviour refers to learning activities, namely (1) seeking information, i.e., searching for information (Wilson 2000) from university students; (2) knowledge sharing, i.e., exchange of information, skills or expertise (Hasmath and Hsu 2016); (3) seeking feedback from university students concerning the way an individual farmer effects learning; and (4) giving feedback to university students regarding what they (students) discuss with farmers. Based on the above theories and literature, the following hypotheses are therefore derived for testing in the context of student-to-farmer university outreach:

H1: Host farmers' perceived social outcome expectations positively influence social influence.
H2: Host farmers' perceived social outcome expectations positively influence the formation of intentions for learning.
H3: Host farmers' perceived social outcome expectations positively influence farmer learning behaviour.
H4: Social influence on host farmers positively influences the formation of intentions for learning.
H5: Social influence on the host farmers of student outreach positively influences farmer learning behaviour.
H6: Farmers' formation of intentions for learning positively influences farmer learning behaviour.
H7: Social influence on host farmers is mediated by the formation of intentions for learning to predict farmer learning behaviour.
H8: Perceived social outcome expectations of host farmers are mediated by both the formation of intentions for

learning and social influence in predicting farmer learning behaviour.

Methodology

Research design and sample selection

A cross-sectional survey was conducted on a sample of farmers purposively selected from the previous host farmers in the student-to-farmer university outreach of GU. These farmers had participated in hosting either undergraduate or graduate or both types of students in the outreach programme during 2007–2016. In this study area, the undergraduate students of GU commuted to and from the farming households for a period of not less than a year (Kalule, Okello, and Ongeng 2016), whereas, the graduate students were involved with farmers' groups and organizations, an approach that allowed these students to reach a large number of farming households, for a period of 2–3 months. Participant farmers were drawn from two neighbouring districts of Gulu and Omoro. From Gulu District, two sub-counties namely Paicho and Bungatira were purposively selected for the sampling of respondents because of relatively higher numbers of previous host farmers of university outreach students compared to other sub-counties. Similarly, two sub-counties of Koro and Bobi from Omoro District were selected for the same reason as in the case of Gulu District.

The method suggested by Krejcie and Morgan (1970) for estimating sample size was followed. Accordingly, the estimated sample size was 274; however, it was adjusted to 283 to cater for any possible dropping out of study participants. Proportional sampling was applied to distribute the sample between the selected districts to ensure representativeness.

Data and data sources

Four constructs were measured using the Likert scale: farmer learning behaviour, farmers' formation of intentions, social outcome expectations and social influence. Farmer learning behaviour, the dependent variable, comprised of seven items modified and adapted from Edmondson (1999) capturing the elements of information seeking, knowledge sharing, feedback seeking 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 (1–5, where 1 = not at all and 5 = always). The construct of formation of farmers' intentions, the mediating variable, was 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, analyzing, conceptualizing and testing. A sample item of the construct is as follows: 'I plan to analyze records at my farm to identify any sources of success'. The items were rated on a 5-point Likert scale (i.e., 1–5, where 1 = unlikely and 5 = most likely).

This study had two psychosocial antecedents: social outcome expectations and social influence. The antecedent of social outcome expectations was adapted and modified to suit the study context from the scale of Wójcicki, White, and McAuley (2009). This construct comprised three items capturing the elements that the farmers learn, namely farming practices, postharvest handling and produce marketing. These elements were related to improvement in farm yields, produce quality and farm incomes. A sample item reads as follows: 'I expect the learnt knowledge on postharvest handling to make the quality of my produce more socially acceptable'. All items were rated on a 5-point Likert scale (1–5, where 1 = strongly disagree and 5 = strongly agree). Finally, for the construct of social influence, the scale was adapted and modified from Ajzen (2002), capturing the elements of social persuasion (influence) from members of the community. A sample item of the construct reads as follows: 'Farmers whose opinion I value influence me to practise learnt crop storage knowledge from university students'. The four items on social influence were rated on a Likert scale as follows: Does not correspond at all = 1, corresponds a little = 2, corresponds moderately = 3, corresponds a lot = 4, and corresponds exactly = 5.

Data analysis

Data were cleaned and transferred to the SPSS–AMOS version 23 for Structural Equation Modelling (SEM). First, the means, standard deviation and percentages for describing the sample characteristics were computed from the social demographic factors. In addition, descriptive statistics were generated for the four constructs. Second, correlates were generated for two reasons: (1) to establish before SEM analysis whether the relationships between the constructs for the study existed and (2) to assess before further analysis whether a risk of multicollinearity existed amongst the constructs. A key precondition for ruling out the possibility of multicollinearity affecting the sound interpretation of SEM results is that that there should be no more than two correlates that are above the minimum threshold value of 0.6 (Hamilton 2006).

SEM for path analysis followed a three-step procedure: data reduction, evaluation of the measurement model and Confirmatory Factor Analysis (CFA). In the first step, data reduction was done using Exploratory Factor Analysis (EFA) that reduced the number of measurement items in each construct to only those that exhibited the best fit. The reason for the EFA procedure was that all the constructs used in this study had been adapted and modified for the current study, which differed from the study contexts in which they were initially developed and tested. In the EFA, measurement items that exhibited cross-loading in different components in an iterative process were dropped. In the second step, the measurement model was evaluated for internal consistency, convergent validity and discriminant validity. This was done through the examination of construct reliability, factor loadings and Average Variances Extracted (AVE) as well as the comparison of the correlates between the constructs with square roots of AVE respectively. In the third step, the structural model was assessed to determine the strength of the hypothesized relationships between the latent variables.

In the SEM, the common indices for assessing model fit were used following the criteria for baseline cut-off points as suggested in Bhatti et al. (2014). The goodness-of-fit indices included the ratio of Chi-square to degrees of freedom (Chi_Sq/df), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Tucker-Lewis Index (TLI), Comparative-Fit-Index (CFI) and Root Mean Square of Error Approximation (RMSEA). Besides path coefficients, SEM in AMOS generates bootstrapping results of standardized effect sizes, which are important for examining the practical relevance of the relationships between the constructs. In behavioural science, it has been argued that it is important to evaluate effect sizes (β) in addition to regression coefficients to explain the practical meaningfulness of the results (Medina 2017). Effect size refers to the degree to which the phenomenon being studied is present in the population (Cohen 1988). Accordingly, the criterion of determining the practical relevance of the results of $\beta = 0.2$ as suggested by Ferguson (2009) was applied. The study further applied the criteria of evaluating effect sizes suggested by Cohen (1988). The Cohen criteria explain that the magnitudes of such effect sizes are considered small if $\beta \leq 0.1$. These effect sizes are medium in size, if $\beta \leq .3$, and they are large if $\beta \geq .5$.

Results and discussion

Sample characteristics

Up to 65% of outreach programme participants hail from the Gulu District. As such, 181 participants representing 64% (Paicho = 94 and Bungatira = 87) were sampled from Gulu District, and 102 farmers representing 35% (Koro = 61 and Bobi = 41) were sampled from Omoro District. The characteristics of the selected sample-based means (M) and standard deviations (SD) are as follows: the experience of the household head in hosting university students in years ($M = 2.18$, $SD = 1.99$), the distance of the household from the university in km ($M = 12.60$, $SD = 8.86$), the farming experience of the household head in years ($M = 23.20$, $SD = 15.15$) and the age of the 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%). Concerning the sex of the household heads, females constituted 35.3% of the sample, and the rest were male.

Assessment of constructs for SEM analysis

The results of the descriptive statistics and correlation analysis amongst the constructs used in this study are presented in Table 1. The results show that the respondents rated the construct of perceived social outcome expectations the highest ($M = 4.606$, $SD = .614$).

The least rated construct was farmer learning behaviour ($M = 3.992$, $SD = .860$). For the other two constructs, farmers rated the construct of formation of intentions for learning the second highest ($M = 4.225$, $SD = .837$) while the second lowest rated construct was social influence ($M = 4.080$, $SD = .851$). The correlation analysis results show that all the constructs in this study were related to each other. Significant correlates were found in the

following relationships: perceived social outcome expectations and social influence ($r = .503$, $P < 0.01$), perceived social outcome expectations and farmer learning behaviour ($r = .409$, $P < 0.01$) as well as social influence and formation of intentions ($r = .224$, $P < 0.01$). Other significant correlations were between social influence and farmer learning behaviour ($r = .511$, $p < 0.01$) and the formation of intentions and farmer learning behaviour ($r = .278$, $P < 0.01$). The only non-significant but correlated relationship was found between perceived social outcome expectations and the formation of intentions for learning ($r = -.005$, $P > 0.05$). Since all relationships had correlates that were less than the value of 0.6, it meant that the assumption of "no multicollinearity" was confirmed in this study.

The results of internal consistency assessment, i.e., composite reliability (CR) revealed that perceived social outcome expectations ($CR = .955$) had the highest value of composite reliability while farmers' formation of intentions ($CR = .918$) was the lowest. Given that all the CR indices were above the recommended minimum threshold of .70, the measurement validity amongst the study constructs was confirmed. Convergent validity was assessed using both standardized estimates of factor loadings (Table 2) and AVE (Table 1). The precondition for attaining convergent validity is that the estimates in either case of factor loadings and AVE must be above the minimum threshold of .50. In this study, the factor loadings in the four constructs ranged from .667 to .883, while AVE values ranged from .579 (perceived social outcome expectations) to .651 (formation of intentions) and, thus, convergent validity was confirmed. Lastly, the comparison of correlates amongst constructs with the values of the square root of AVE revealed adequate discriminant validity. The precondition is that the square root of AVE values must be greater than the correlates. In this study, all the values of the square root of AVE indices that ranged from .727 (farmer learning behaviour) to .807 (formation of intentions for learning) were greater than the correlates. This meant that the intra-construct variance was greater than the inter-construct variance, justifying construct distinctness, and, thus, discriminant validity was confirmed. The results of confirmatory factor analysis (Figure 1) show that the specified structural model yielded SEM results that depicted a perfect model fit.

The comparison of GFI with baseline values (spec.) as articulated in Bhatti et al. (2014) revealed that the ratio of chi-square to the degrees of freedom (chi-sq/df) = 1.48 (spec. ≤ 3), GFI = .93 (spec. ≥ .90) and AGFI = .91 (spec. ≥ .90) met precondition specifications. Similarly, the preconditions of goodness-of-fit were met for the following indices: TLI = .97 (spec. ≥ .95), CFI = .97 (spec. ≥ .95), and RMSEA = .05 (spec. ≤ .08). The R^2 at the dependent variable was .33, meaning that social cognitive predictors specified in this study explained up to 33% of the total variation in the farmer learning behaviour in the student-to-farmer university outreach.

Path analysis

Table 3 presents the estimates of the path coefficients of the prediction relationships amongst constructs, whereas

Table 1: Descriptive statistics and correlates of social cognitive determinants of farmers' learning

Variables	Mean	SD	CR (ρ)	AVE	1	2	3	4
						Correlations		
1. Perceived social outcome expectations	4.606	.614	.955	.579	.761			
2. Perceived social self-efficacy	4.080	.851	.931	.581	.503**	.762		
3. Farmers' formation of intentions	4.225	.837	.918	.651	−.005	.224**	.807	
4. Farmer learning behaviour	3.992	.860	.936	.529	.409**	.511**	.278**	.727

** means significant at $P < 0.01$, all figures on the diagonal $= \sqrt{AVE}$

the bootstrapping results of the post-hoc analysis using standardized effect sizes are presented in Table 4. Concerning the path analysis, the results showed that perceived social outcome expectations of host farmers was a significant predictor of social influence ($\beta = .717$, $t = 7.090$, $P < 0.01$), supporting H_1. Similarly, perceived social outcome expectations was a significant predictor of farmer learning behaviour ($\beta = .227$, $t = 1.978$, $P < 0.05$), a finding that was in support of H_3. Further, social influence was a significant predictor of both farmers' formation of intentions for learning ($\beta = .306$, $t = 3.695$, $P < 0.01$) and farmer learning behaviour ($\beta = .372$, $t = 4.448$, $P < 0.01$). These two findings were thus in support of hypotheses H_4 and H_5 respectively. Lastly, farmers' formation of intentions was a significant predictor of farmer learning behaviour ($\beta = .214$, $t = 3.254$, $P < 0.01$), hence supporting H_6.
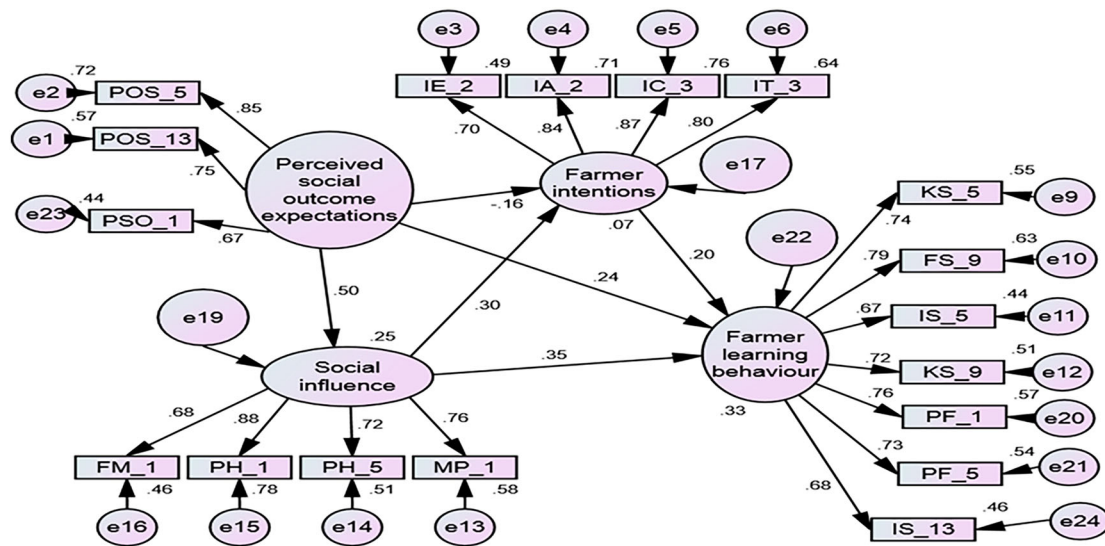
However, perceived social outcome expectations was not a significant predictor of farmers formation of intentions ($\beta = −.227$, $t = −1.885$, $P > 0.05$), meaning that H_2 was not supported. As perceived social outcome expectations predict social influence, it means that the result is in conformity with the theoretical expectation. This is because with the assumption of reciprocal influences of SCT between cognitive factors and environment factors, either social outcome expectations or social influence can predict the other (Anderson et al. 2006). The result is also in agreement with related studies on the role of outcome expectations on farmer behaviour, particularly the continued usage of technologies (Spaulding, Tudor, and Mahatanankoon 2015). The positive influence of social outcome expectations on farmer learning behaviour was also in conformity with theory as explained in the study of Dewar et al. (2012). Similarly, the positive effect of social influence on farmer learning behaviour corroborated the results reported in the study by Zeweld et al. (2017), notably that social support predicts farmer behaviour. However, the results on social influence in significantly predicting the formation of intentions differed from a related study of Menozzi, Fioravanzi, and Donati (2015) that reported insignificant findings. Lastly, the positive influence of formation of intentions on farmer learning behaviour also matched the findings from an earlier study that reported that the formation of intentions influenced the behaviour (Ajzen, Czasch, and Flood 2009).

Table 2: Estimates of factor loadings.

Item	FLB	FFI	PSOE	SI
	Standardized factor loadings			
I seek information on farming practices from university students (IS_5).	.667			
I seek information on produce marketing from university students (IS_13).	.681			
I share the knowledge of new ideas of farming practices with university students (KS_5).	.738			
I share the knowledge of postharvest handling with university students (KS_9).	.716			
I seek feedback on produce postharvest handling from university students (FS_9).	.791			
I give feedback on farming business plans to university students (PF_1).	.755			
I give feedback on new ideas of farming practices to university students (PF_5).	.734			
I plan to take records of the farming activities on my farm (IE_2).		.700		
I plan to analyze records at my farm to identify any sources of success (IA_2).		.842		
I plan to think through the records at my farm on what has gone well in the previous year (IC_3).		.874		
I will try to use the records of my farm for making future decisions (IT_3).		.800		
I expect the learnt knowledge on farm practices to improve my performance to the level more valued by other farmers (POS_1).			.667	
I expect the learnt knowledge on postharvest handling to make the quality of my produce more socially acceptable (POS_5).			.851	
I expect the learnt knowledge on farming business plans to put me at ease with other people of high incomes (POS_13).			.754	
Farmers in my community influence me to share with others the learnt planting knowledge from university students (FM_1).				.675
Farmers in my community influence me to share with others the postharvest handling knowledge from university students (PH_1).				.883
Farmers whose opinion I value influence me to practise the learnt crop storage knowledge from university students (PH_5).				.717
Farmers in my community influence me to share with others the knowledge on the marketing of crop produce from university students (PM_1).				.759

FLB = Farmer learning behaviour, FFI = Formation of intentions, PSOE = Perceived social outcome expectations, SI = Social influence

Figure 1. Social cognitive factors affecting farmer learning behaviour in the student-to-farmer university outreach.

The findings in this study, particularly those pertaining to the role of social outcome expectations and social influence, are in support of the line of thinking suggested by Sewell et al. (2017). The Sewell et al. (2017) study supports the view that new extension approaches need to exploit the social cognitive environment of farmers for long lasting learning and uptake of innovations. It has been suggested that farmer learning is embedded in their social interactions as a community of learners (Sewell et al. 2014). Therefore, it can be argued that in the context of student-to-farmer university outreach, actual farmer learning behaviour is influenced by the social reactions from peers that the participation in student outreach activities may bring improved benefits to the target communities. Second, the positive effect of social influence on farmer learning means that host farmers perceive positive social pressures for participation in student outreach activities from their peers, in farmer groups, the community and other people whose opinions they value. The result further suggests that communities approve host farmers' decisions of participating in the student-to-farmer university outreach. This finding is in agreement with the argument by De Snoo et al. (2013) that social support is important for enacting farmer behaviour. The influence of peer farmers can be important for social reinforcements either through positive persuasion (influence) or encouragement to the host farmers. This can be in terms of sharing with other farmers the knowledge learnt from students or putting into practice such knowledge in their farms.

The bootstrapping results presented in Table 4 show that the indirect standardized effects for the formation of intentions ($\beta = .061$, 95%, CI $= .019 \sim .143$) in the mediation relationship between social influence and farmer learning behaviour were statistically significant. Thus, H_7 that farmers' formation of intentions mediates social influence in predicting farmer learning behaviour was confirmed. Further, social influence together with farmers' formation of intentions mediated perceived social outcome expectations in predicting farmer learning behaviour ($\beta = .174$, 95% CI $= .074 \sim .299$). This mediation was also statistically significant; thus, H_8 was confirmed. The result suggests that based on farmers' social cognition perspective, perceived social outcome expectations is a strong initiator of farmer learning behaviour, and this antecedent is mediated by social influence and formation of intentions in the student-to-farmer university outreach.

Apart from the relationship between perceived social outcome expectations and farmers' formation of intentions (H_2: $\beta = -.005$, 95%, CI $= -.123 \sim .122$), all other effect sizes conformed to the criterion of practical relevance as suggested by Medina (2017). The biggest effect size was detected in the relationship between perceived social outcome expectations and social influence (H_1: $\beta = .503$, 95%, CI $= .357 \sim .634$). This finding was significantly different from zero and met the criterion of large effect suggested by Cohen (1988). This meant that within the study population, perceived social outcome expectations predict more than 50% of the total variation in social influence. This new piece of evidence affirms that perceived social outcome expectations was an important factor for initiating social influence amongst the host farmers of student outreach. It means that social outcome expectations stimulate social reinforcements among host farmers to engage in learning behaviours with students. It is therefore worth arguing that beliefs, amongst members of the farmer communities, that learning from

Table 3: Testing of hypotheses.

Path	Path Est., β (S.E)	*t*-value	Hypothesis Testing Decision
H_1: Per. social outcome expectations > Social influence	.717 (0.10)	7.09**	Supported
H_2: Per. social outcome expectations > Farmers' formation of intentions	−.227 (0.12)	−1.89	Not Supported
H_3: Per. social outcome expectations > Farmer learning behaviour	.227 (0.12)	1.98*	Supported
H_4: Social influence > Farmers' formation of intentions	.306 (0.08)	3.70**	Supported
H_5: Social influence > Farmer learning behaviour	.372 (0.08)	4.45**	Supported
H_6: Farmers' formation of intentions > Farmer learning behaviour	.214 (0.07)	3.25**	Supported

* and ** = $P < 0.05$ and $P < 0.01$ respectively

university students brings improvement in farm yields, quality of farm products and farm incomes are important for achieving lasting relationships in university-community linkages. These beliefs can stimulate social influence, including social persuasion and encouragement from peers to host farmers to embrace university student outreach as a platform for farmer learning.

The second biggest effect sizes were detected in two prediction relationships: perceived social outcome expectations and farmer learning behaviour (H_3: $\beta = .409$, 95%, $CI = .233 \sim .569$) as well as social influence and farmer learning behaviour (H_5: $\beta = .409$, 95%, $CI = .226 \sim .577$). The two findings were above the medium size criterion ($\beta = 0.3$) but still less than the large effect size ($\beta = 0.5$). These two findings imply that both perceived social outcome expectations and social influence predict (each separately and holding other factors constant) up to 41% of the variation in farmer learning behaviour. The results also show that social influence (H_4: $\beta = .303$, 95%, $CI = .128 \sim .495$) predicts more than 30% of the variation in farmers' formation of intentions. The result met the criterion of medium effect size. Lastly, farmers' formation of intentions (H_6: $\beta = .201$, 95%, $CI = .066 \sim .352$), predicts 21% of the variation in farmer learning behaviour. Accordingly, the finding meets the criterion of practical significant ($\beta > 0.2$).

The role of social influence in predicting farmer intentions and actual learning behaviour detected in this study corroborates the results reported in the study by Zeweld et al. (2017). Previous research suggested that host farmers perceived that the quality of knowledge as well as the attitudes that university students exhibit during field/farm placement are important factors for farmer-level learning during the student-to-farmer university outreach (Kalule et al. in press). Further, previous research has shown that host farmers exhibit considerable motivation for learning if there is sufficient faculty supervision

support to students while on field attachment (Darishah, Daud, and Omar 2017). Both the student- and faculty-based factors are intervention factors that originate from the university. However, the results from the current study suggest that student- and faculty-based factors, as perceived by host farmers, may not be the only relevant drivers of farmer learning from student outreach. In addition to these factors, the social environment (for instance, social approvals and social pressures) in which the host farmers are embedded is equally important. It can be argued that farmer perceptions of social outcome expectations and social influence cannot be ignored for farmer learning, rather complement the perceived quality of student knowledge and attitudes as well as faculty supervision support in the SCO.

Conclusions and recommendations

This study underscores the importance of the perceived social outcome expectations and social influence on host farmers in predicting their learning behaviour in a student-oriented university outreach format. It has been demonstrated that perceived social outcome expectations are significant predictors of both social influence and farmer learning behaviour. It has also been shown that social influence significantly predicts both the formation of intentions for learning and farmer learning behaviour. In all, both social influence and the formation of intentions mediate the perceived social outcome expectations in predicting farmers' learning behaviour. The results indicate some degree of dependence of farmer learning behaviour on non-personal factors, particularly within the host farmers' social environment.

The findings in this study suggest that paying attention to the social approval by peer farmers and social pressure on host farmers is important for achieving learning in student-to-farmer university outreach. Particularly, the social reactions anticipated by the host farmers of

Table 4: Bootstrapping and mediation analysis.

	Standardized effects			Bias-corrected (95% CI)	
Path	Direct	Indi.	Total	Lower bound	Upper bound
H_1: Per. social outcome expectations > Social influence	.503	-	.503	.357	.634
H_2: Per social outcome expectations > Farmers' formation of intentions	−.158	.152	−.005	−.123	.122
H_3: Per. social outcome expectations > Farmers' learning behaviour	.235	.174	.409	.233	.569
H_4: Social influence > Farmers' formation of intentions	.303	-	.303	.128	.495
H_5: Social influence > Farmers' learning behaviour	.348	.061	.409	.226	.577
H_6: Farmers' formation of intentions > Farmers' learning behaviour	.201	-	.201	.066	.352
H_7: Social influence > Formation of intentions > Farmers' learning behaviour	-	.061	.061	.019	.143
H_8: Per. social outcome expectations > Social influence + Formation of intentions > Farmers' learning behaviour	-	.174	.174	.074	.299

university students is important for their effective participation in university outreach. Social outcome expectations are seemingly the trigger for social influence (in the form of social persuasion and encouragement) amongst host farmers to actively engage in learning activities facilitated by university students. It then follows that the social setting of the host farmers is critical for student-to-farmer university outreach in a sense that it can generate social reinforcements for effective farmer learning if well exploited. Meaningful farmer learning can also be negatively affected if student deployment to the communities and actual student outreach activities are not sensitive to the social cognitive environment in which the host farmers are embedded.

This study contributes to further development of the social cognitive theory as well as practice. It has successfully applied two constructs of SCT, namely perceived social outcome expectations and social influence. These constructs have been used to assess the influence of a social cognitive environment on farmer learning behaviour in student-to-farmer university outreach. Indeed, the results suggest that farmers' social cognitive environment cannot be taken for granted in pursuit of farmer learning in student-oriented outreach approach. Strategic targeting of these social cognitions can easily guarantee sustainable learning relationships and university–community linkages. From a practical perspective, the outcomes of this research give the impression that understanding the social context of the host communities is critical for designing an effective university outreach programme that impacts on the learning of these communities. The key elements of farmers' social cognitive environment which the managers of outreach programmes should not overlook are social approvals for host farmers' participation in outreach programmes. These social approvals are likely to stimulate social persuasions and reinforcements from peers to host farmers in support of learning.

We recommend that managers of university outreach programmes devote efforts to preparing students to be sensitive to the concerns of the community as a whole, rather than just the host farmers. For instance, outreach managers should organize community sessions to explain the objectives and procedures of student–community attachments before concentrating on individual host farmers. Similarly, an exit strategy should always be planned to share with the community members on what was achieved during the period of student farm placement. If such a process is well managed, host communities may easily appreciate the efforts of the managers of university outreach and consequently trigger the social reinforcements that support farmers to learn from students. As the current study focused only on the positive social outcome expectations, future research should examine the negative aspects of the social outcome expectations of host communities in student-oriented university outreach. It is presumable that negative expectations may influence farm learning from student farm placements. Further studies can re-examine the influence of social outcome expectations on farmers' formation of intentions for learning. This is because the relationship turned out to be insignificant in the current study. Such a study can be done using datasets drawn from an environment that is different from the current study context.

One limitation of this study, however, is that it was not possible to separate the differences in the effects of graduate and undergraduate student involvement with farmers. This makes it difficult for the current study to be generalized to student outreach formats relying exclusively on one category of students, either graduate or undergraduates only. A second limitation is that the study was conducted in two neighbouring districts with relatively similar social agro-ecological conditions. Consequently, this limits the generalizability of the study results to geographic areas with different social agro-ecological conditions. This limitation can be overcome by replicating the research design employed in the current study in different regions with varying socio-cultural and agro-ecological conditions.

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No potential conflict of interest was reported by the authors.

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