

The Interplay of Social Interaction, Personality Traits, and Educational Level in Students' Knowledge Sharing Behaviors

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This study explores the relationships between social interaction (SI), personality factors, educational level (EL), and knowledge-sharing behaviors (KSB) among students. Using data from an online survey of 300 students, the research highlights a significant influence of personality on KSB, with extraversion emerging as the most impactful trait. Social interaction also plays a key role, though its impact is more for knowledge asking (KA) than knowledge giving (KB). Interestingly, SI partially shaped personality development, enhancing traits like extraversion and openness and reducing neuroticism, but showing no significant effect on agreeableness and conscientiousness. Educational level showed a minimal direct impact on KSB. However, SI moderated the relationship between personality and KSB, notably for extraversion and neuroticism in the context of KA. SI also moderated the relationship between EL and KSB, but again, only in the context of KA. These findings underscore the complex interplay between social interaction, personality traits, educational level, and students' knowledge-sharing behaviors. The study offers new insights for higher educational policy and practice.

Knowledge Sharing Behaviors, Social Interaction, Personality Factors, KSB and Personality, Social Interaction and KSB

1. Introduction

1.1 Research Background

Knowledge-sharing behavior (KSB) has been studied previously as critical to academic success in higher education (Iqbal, 2021). KSB has also been linked with enhanced problem-solving abilities (Wang and Lin, 2021) and future employability skills (Chatterjee et al., 2020; Gamlath and Wilson, 2017; Neştian et al., 2021). There is also some research in the context of antecedent factors of KSB, predominantly, the impact of organizational factors like availability of KSB platforms, structural and institutional support, and trust; and personal factors like self-efficacy (Al-Kurdi et al., 2018). Studies suggest that KSB in educational settings can be driven by structural guidance, but may also depend on individual motivation and context.

Personality is an essential factor in knowledge sharing, though studies exploring the impact of personality on students' KSB are scarce (Keshavarz, 2022; Lin et al., 2024). While personality has been linked with behavior in previous studies, an in-depth exploration of how specific personality factors affect KSB was not undertaken. This gap underscores the need to examine how individual differences, such as personality traits, can shape KSB, as the insight can help policymakers and educators to tailor suitable interventions to enhance KSB. It can be presumed that personality traits like extraversion, agreeableness, or openness are likely to encourage individuals to be more outgoing, sociable, or exhibit intellectual curiosity (Nishanthi and Munasinghe, 2020; Al Husaini et al., 2024), and neuroticism may lead to fear of social settings and impact negatively on KSB (Alnaimi and Rjoub, 2021), but empirical research evaluating these impacts is almost nonexistent. By exploring and

understanding these relationships, it is possible to develop practices and policies that can enhance KSB and improve collaborative learning and future employability of students. Such research can provide specific links to KSB and guide educational institutions to develop conducive environments supporting or encouraging KSB among individuals with different personalities.

Further, social interaction (SI) has been studied as a factor influencing knowledge sharing practices and policies. In an academic setting, if there are opportunities for students to interact, they can improve their KSB (Baber, 2022; Hosen et al., 2021). While meaningful and frequent SI has been found to foster trust and understanding and to facilitate KSB in business contexts (Nguyen et al. 2021; Yu et al., 2021), the scope of similar linkages with KSB in educational settings has not been researched. Exploring the impact of SI on KSB in the educational setting is crucial, as SI can lead to trust building and collaboration, which are critical in collaborative learning in academic settings. In higher educational settings, SI is structured to match the needs of the educational level. For example, at the undergraduate level, and largely for the graduate students, SIs are structured and faculty-driven, but for postgraduate students, SI may be more personal and mentorship-based (Gorinelli et al., 2022). Rethinking SI at different levels can impact students' KSB. However, most recent research has discussed social media-related social behaviors and their impact on academic outcomes (Barton et al., 2021), rather than structured and offline interactions. This lack of focus on offline and structured interactions highlights an exigent need to explore the influence of SI on KSB in traditional educational settings.

Additionally, personality is largely shaped by social interactions, though much of the theories and research in this context are limited to early childhood personality development (Kolhar and Kazi, 2021). A more recent approach to personality has suggested that personality development and changes can occur throughout life (Wang et al., 2022), suggesting that social interactions may continue to play an important role during academic years. As such, there is a need to understand how SI shapes personality and subsequently influences KSB, as the insights can help educators design programs and modules that can harness SI and create a knowledge-sharing culture. Extending the logic, it can also be suggested that SI, personality, and KSB may be more intricately linked, and evaluating these relationships may help find ways to encourage KSB among students. The current research, therefore, aims to fill the following gaps and set objectives to fill them:

1.2 Gaps and Objectives

The research aims to provide new information and add to the understanding of how personality factors specifically impact KSB, and how SI may be impacting the relationship between personality and KSB. The exploration of these relationships addresses the critical need to understand how individual (personality traits) and situational factors (social interactions) may be interacting to influence KSB. Further, the lack of comparative research on KSB among students from different educational levels and its impact on their KSB also underscores a need for further exploration, which is taken in this research. The inclusion of educational levels into consideration provides a practical dimension to the study by helping educators determine if customized approaches are required at undergraduate, graduate, and postgraduate levels to enhance KSB. Studying the intricacies of the relationship between SI, personality, and educational levels on KSB, the current research will provide deep and practical insights into fostering a knowledge-sharing culture in academia. The following research questions are, therefore, developed to provide insights and fill the gaps as identified above:

1.3 Research Questions

- How does Personality impact Knowledge-Sharing Behaviors (KSB) in students in higher education?
- How does Social Interaction impact KSB in students in higher education?
- What is the impact of Social Interaction (SI) on personality in students in higher education?

- What is the influence of the Educational Level on KSB in students in higher education?
- Does SI moderate the relationship between personality and KSB in students in higher education?
- Does SI moderate the relationship between Education Level and KSB in students in higher education?

2. Theoretical Framework

This research is underpinned by the Social Exchange Theory (SET) (Blau, 1964; Homans, 1958), the Social Learning Theory (SLT) (Bandura, 1977), and the Five-Factor Model (FFM) (John et al., 2008; Hayes and Joseph, 2003). SET postulates that human behavior, such as KSB, is motivated by cost-benefit analysis and based on reciprocal benefits. SET, therefore, explains why students may indulge in KSB. Next, SLT (Bandura, 1977) states that learning occurs due to observation and interaction with others, and is the result of emulation of behaviors and values. SLT guides how social interactions may be contributing to KSB. Further, FFM suggests five core dimensions of personality: extraversion, agreeableness, openness to experience, conscientiousness, and neuroticism. FFM theory allows for understanding personality traits in a quantitatively measurable form and enables exploration of their impact on KSB.

3 Literature Review

3.1 Knowledge-Sharing Behavior Among Students in Higher Education

Knowledge-sharing behavior (KSB) has been studied substantially due to its impact on academic outcomes (Iqbal, 2021). Several scholars have linked organizational climate (Al-Kurdi et al., 2020), transformational leadership (Kim and Park, 2020), and organizational culture (Shehzad et al., 2023) to KSB. Further, consequences of KSB in an academic setting include the facilitation of intellectual discourse and enhancing problem-solving (Ghadirian et al., 2014), leveraging diverse perspectives (Gamlath and Wilson, 2017), enhanced employability skills like communication skills, critical thinking, and teamwork (Gamlath and Wilson, 2017), and fostering self-confidence (Chatterjee et al., 2020; Hosen et al., 2021). According to Al-Kurdi et al., much of KSB is initiated voluntarily in academic settings, unlike in business contexts, where there may be an institutional thrust to encourage knowledge sharing, which implies that individual and contextual factors may play a major role in promoting KSB in academia (Al-Kurdi et al., 2018). Given the voluntary nature of KSB in academic settings, individual differences (like personality traits) and contextual influences (like social interaction) may have unique and combined effects on KSB. Several studies have focused on understanding the underlying factors promoting KSB. For example, Ghadirian et al. postulate the importance of self-confidence in students' voluntary engagement in KSB (Ghadirian et al., 2014). Students with high self-efficacy may feel confident to share their knowledge and consider their contribution worthwhile. Similarly, students who perceive their learning environment as highly competitive may indulge in evasive or rationalized hiding of their knowledge (Ghani et al., 2019). This implies that personal factors like personality traits, trust, and structural factors like social interaction are critical in shaping KSB. Though KSB is a voluntary activity, it can be facilitated by organizational efforts that enhance social interaction. A conducive culture based on trust and inclusivity (Al-Kurdi et al., 2018), and the availability of knowledge-sharing technology and tools (Usman and Oyefolahan, 2014), a curriculum that requires teamwork (Hosen et al., 2021), and teachers who foster KSB (Tan, 2016) can impact KSB. These findings from previous studies guided the choice of social interaction as a key factor in this research for exploring its impact on personality, education levels, and KSB. Also, factors that enhance social interaction likely lead to KSB among students. However, the existing literature underscores the lack of studies that consider the comprehensive impact of social interaction, personality, demographic variables, or the level of education on students' knowledge-sharing.

3.2 Personality

3.2.1 What is Personality

Personality is determined by consistent patterns of emotions, thoughts, and behavior (Hughes et al, 2020), and impacts on decision-making (Kumar et al., 2023) as well as engagement with the world (Mustafa and Zhang, 2024). Several theories have explored the construct of personality in detail (for example, The Big Five Personality Factors (De Raad 2000); psychodynamic theories of personality as suggested by Sigmund Freud, Carl Jung, and Erik Erikson (Taylor 2009); and humanistic theories of personality as suggested by Abraham Maslow and Carl Rogers (Piechurska-Kuciel, 2020; Watson and Greenberg, 1998). Also, personality has been studied extensively in the context of organizational behavior (Din et al. 2023; Hermawan, 2023; Todorović and Jovanović, 2024), leadership behavior (Shahzad et al. 2022; Supratman et al., 2021; Yang et al., 2020), productivity (Kallio et al., 2020), and several other employee outcomes (Alam et al., 2020). As the above studies highlight, personality factors impact individual behavior across diverse domains and can impact autonomy and competence in classrooms (Escandell, 2023). Given its influence on individuals' behavior, personality was selected for the current research as a factor likely to shape students' willingness and ability to engage in KSB. There is, nevertheless, a lack of studies focusing on the personality of students and its consequences on academic outcomes, and very few studies have discussed KSB in the context of personality.

3.2.1 Personality and KSB

Some studies have linked personality attributes to KSB among students. For example, being open to experiences (Mammadov, 2022), extraversion (Al Husaini et al., 2024), and agreeableness (Farrukh et al., 2020; Nishanthi and Munasinghe, 2020) have been associated with KSB among students, respectively. Conscientiousness, however, has been found to have an ambiguous impact on KSB (Guo et al., 2021; Munasinghe, 2019), as conscientious students may be focused on personal achievement alone. Neuroticism, on the other hand, has been reported to lower KSB as emotional stability or anxiety may prevent students from sharing out of fear of criticism or lack of confidence (Munasinghe, 2019). The previous research on personality factors has yielded mixed evidence of the role of individual personality factors and underscored the need to investigate which traits most strongly support or hinder KSB. However, trust has been found to mediate the relationship between personality and KSB. For example, Alnaimi & Rjoub found that trust reduced the negative impact of neuroticism and improved the positive effects of openness and agreeableness (Alnaimi and Rjoub, 2021). Further, the link between personality and KSB may be affected by cultural context. Traits like agreeableness valued in collectivist cultures may enhance KSB in such a setting (Al Husaini et al., 2024). As seen from previous studies, personality factors are relevant in both individual and cultural contexts, and this study aims to explore how these traits may interact with other factors, like SI, in shaping KSB for students. As such, the following hypothesis is developed: H1: Personality impacts knowledge-sharing behaviors

3.3 Social Interaction (SI)

3.3.1 What is SI

Social interaction is any exchange between two or more people and may be guided by norms and cultural context (Baber, 2022). Social interactions form the basis of social relationships and can be face-to-face, online, or through any other means; they can be in the form of a brief greeting or more complex interactions like negotiations or conflict resolution. Social interactions are also influenced by the roles society assigns people (Goffman, 1967). They are also impacted by how people think others perceive them (Cooley, 2017; Genov, 2021). Nevertheless, social interactions largely depend upon affinity, proximity, empathy, or motivations and drives, and can lead to complex outcomes like developing mutual understanding, trust, and sharing (Kirtay, 2021; Jang, 2024; Southworth, 2022). As SI is an important element in fostering trust and collaboration, it is a factor that enhances KSB in educational contexts.

3.3.2 SI and KSB in Educational Settings

Social interaction (SI) has been mostly studied in the context of social media usage among students (Baber, 2022; Hosen et al., 2021; Kolhar and Kazi, 2021; Rasheed et al., 2020), and very few studies have linked SI explicitly and directly with KSB (Baber, 2022; Hosen et al., 2021). Nevertheless, some studies have explored the impact of SI on KSB, but mostly in a business setting. For example, Nguyen et al. report that opportunities for social interaction among bank employees in Myanmar lead to meaningful and frequent communications and enhanced trust; thus emphasizing that frequent and meaningful interactions among employees build trust, leading to KSB (Nguyen et al. 2021; Yu et al., 2021). Similarly, Vranić et al. found that SI fostered trust and cohesiveness among stock exchange communities, leading to KSB (Vranić et al., 2022). Also, social interactions that allow people to display altruistic attitudes lead to KSB among employees in Croatia (Obrenovic et al., 2020). These findings, though from business contexts, indicate that SI can foster trust and collaboration, making it a crucial factor to examine in academic settings where trust and collaborative learning are known to lead to KSB (Nguyen et al. 2021). While there is a dearth of studies on the impact of SI on KSB among students, there is literature to indicate that such a link may exist. As such, the following research hypothesis is developed: H2: Social Interaction impacts knowledge-sharing behaviors

3.3.3 Social Interaction and Personality

Several theories have postulated social interaction, especially during early childhood, as a crucial factor in personality development. Attachment theory suggests that interaction with caregivers impacts the trust and emotional stability of the child in adult life (Bowlby, 1969). Similarly, Bandura's Social Learning Theory suggests that children learn through observation and internalize emotional responses, attitudes, and behaviors (Bandura, 197). However, these early theories consider personality as a fixed and non-plastic aspect, and personality development to take place during early childhood (Bandura, 197). Contemporary theories suggest a more plastic or fluid and interaction-based understanding of personality, indicating that personality is not fixed but malleable and changeable and expressed differently in different contexts based on situational social interactions (Back, 2021). For example, Roberts et al. report that personality traits change based on social roles adopted over a person's lifespan (Roberts and DelVecchio, 2000). As such, adults with work and family responsibilities are likely to develop more emotional stability and conscientiousness. Similarly, personality develops in early childhood and adolescence, where positive peer relationships improve extraversion and agreeableness, and negative interactions may lead to neuroticism (Back, 2021). Other studies have found that high-quality adult social interactions improve levels of extraversion and agreeableness, and reduce neuroticism (Back, 2021; Roberts and DelVecchio, 2000). These findings show how SI and personality may be linked and suggest that SI may potentially shape personality traits over time. This connection between the two variables is also relevant in academic settings, especially when there are structured SI in the form of mentorships or group tasks, and may indicate that such SI can influence students' personality development.

Neuroscience studies have found that positive social interaction leads to functional and structural changes in the prefrontal cortex and other brain regions responsible for cognition and emotional regulation (Kirtay, 2021). The above studies suggest a link between SI and personality, though there is a lack of similar research in the context of higher education. As such, the following hypothesis is developed to fill the gap: H3: SI Impacts on Personality among Students in Higher Education

3.3.4 SI, Personality, and KSB

Lin et al. found that trust leads to KSB, but its impact on KSB is moderated by social interaction (Lin et al., 2024). Nguyen et al. reported that SI moderates the relationship between absorptive capacity and knowledge sharing (Nguyen et al. 2021), and Ding et al. (2024) suggest a moderating impact of

personality on human resource management practices targeted at knowledge sharing. While these studies indicate extraversion personalities are likely to take more advantage of social interaction opportunities and share knowledge, these are focused on employees and business settings rather than educational settings (Ding et al., 2024). This lack of research on the moderating role of SI in academic contexts suggests an important gap that needs to be filled to enable educators to design better collaborative learning environments suited for diverse personality traits. Nevertheless, social interaction enhances trust and understanding, and is likely to affect how students with different personalities share knowledge.

As such, the following hypothesis is presented: H4: Social Interaction (SI) moderates the relationship between personality and knowledge-sharing behaviors.

3.5 Education Level, SI, and KSB

3.5.1 Educational Level and KSB

While several studies have explored KSB and its antecedents and consequent factors among students, only one study was comparative. Rahman et al. compared postgraduates and undergraduates and reported that postgraduates displayed more KSB (Rahman et al., 2014). This is a glaring gap in research that needs to be filled. Exploring how education level influences KSB at different stages of education can lead to a better understanding of how they can be encouraged to share. Based on Rahman et al. (2014), it can be hypothesized that:

H5: Education level impacts KSB among students.

3.5.1 Education Level, SI, and KSB

Social interaction (SI) is likely to vary across educational levels based on factors like the size of the class, teachers' engagement, the teamwork required, and the overall academic environment, which differs at educational levels. While no comprehensive studies are available that discuss these differences or link them with SI, there is some research on classroom dynamics at different levels. Class size is large for undergraduates and enables broader peer engagement, giving opportunities for superficial sharing. Also, faculty engagement at this level is structured and formal but is limited in personalized engagement (Majid and Wey, 2009; Flott et al., 2022). The predominant focus at the undergraduate level is for the students to follow instructions under structured guidance, with lesser emphasis on collaborative work. In contrast, at the graduate level, the class size is smaller but allows for more meaningful interactions, leading to trust building. Further, faculty are more likely to mentor students and encourage collaboration and teamwork, thus facilitating further social interactions (Flott et al., 2022; Johnson, 2015; Seery et al., 2021).

While there are indications that education level impacts KSB among students, and diverse education levels facilitate different SI for students, there is no comprehensive study exploring how SI may be moderating the impact of educational level and knowledge sharing. As such, the following hypothesis is developed:

H6: Social Interaction (SI) moderates the relationship between education level and knowledge-sharing behaviors.

4. Materials and Methods

The research uses a positivist approach as it aims to study and describe the relationships between constructs that are well-known and studied previously, and hence can be measured using structured instruments (Park et al., 2020). The research used 300 students from different countries in a global online survey. The sample selection is done using a random sampling approach, by making the questionnaire available online on social media platforms and encouraging connections to share and promote it. Online sampling enables an efficient and cost-effective way to reach a diverse global

sample of students. This way, a set of global responses was collected, and the survey was stopped when 300 completed responses were received. To control the quality of responses, a preliminary screening question asked the respondents to state if they were undergraduate, graduate, or postgraduate students. Also, only one response was allowed per respondent. The research developed an extensive questionnaire using questions from the Big Five Inventory (BFI) (John and Srivastava, 1999) to gauge the information on personality traits, the Social Interaction Scale (Core Empowerment Group, 2022), and the KSB scale (Lee, 2018). These scales have been used extensively in previous studies and can be found in Appendices A, B, and C, respectively. The collected data were analyzed using descriptive statistics, correlation analysis, and multiple regression analysis to assess the relationships as hypothesized in Section 3 above.

5. Results

5.1. Demographic Characteristics of the Respondents

The following Figure 1 shows that the majority of the respondents were undergraduate students (47.3%), followed by graduate students (43.0%), with only 9.7% of them being postgraduate students.

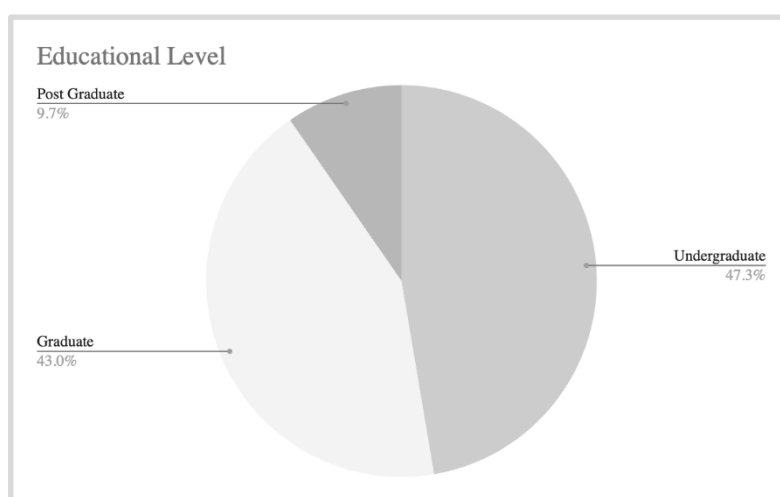


Figure 1: Educational Level of the Respondents (Source: Author)

Also, there was a slightly larger number of female students, comprising 53.3% of the sample. See Figure 2 below.

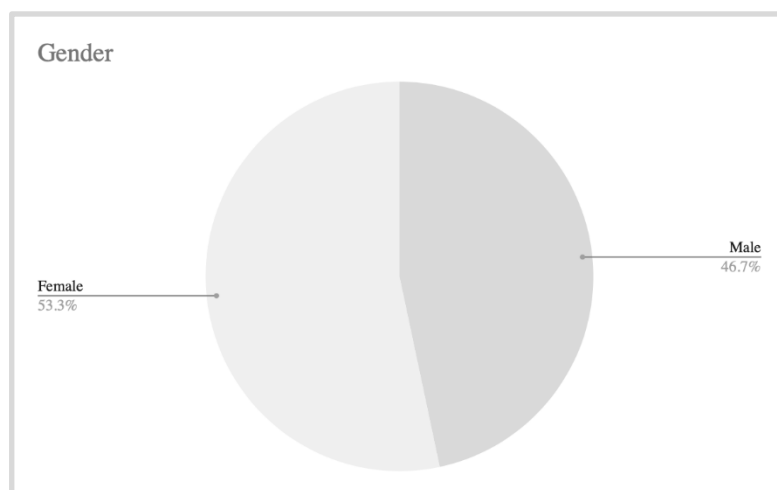


Figure 2: Gender of the Respondents (Source: Author)

The majority of the respondents were under 20 years of age (18-year-olds making up 37.3% and 19-year-olds making up 17.3% of the sample). See Figure 3 below. This supports the findings from Figure 1, where the majority of students were from undergraduate courses.

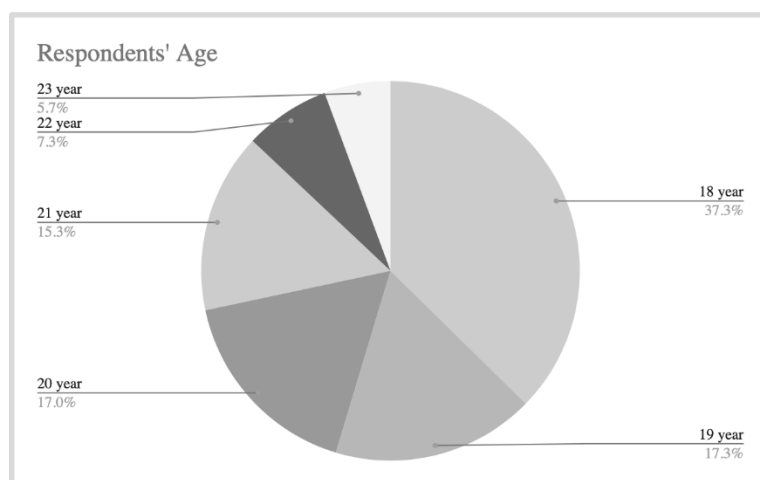


Figure 3: Age of the Respondents (Source: Author)

5.2 Descriptive and Reliability Analysis

The following Table 1 shows the descriptive statistics and reliability of the findings.

Table 1. Mean, SD, Cronbach Alpha, and Range

Range Variables	<i>M</i>	<i>SD</i>	α	Potential	Actual	Skewness
Extraversion (E)	4.177	0.753	0.792	1-5	1.00-5.00	-1.442
Agreeableness (a)	3.892	0.688	0.657	1-5	1.00-5.00	-1.023
Conscientiousness (C)	3.984	0.678	0.686	1-5	1.00-5.00	-1.144
Neuroticism (N)	4.281	0.748	0.834	1-5	1.00-5.00	-1.673
Openness (O)	4.096	0.649	0.696	1-5	1.00-5.00	-1.296

Social interaction (SI)	1.740	0.701	0.836	1-4	0.00-4.00	0.731
Knowledge Giving (KG)	5.070	0.219	0.845	1-6	4.00-6.00	0.072
Knowledge Asking (KA)	5.074	0.239	0.858	1-6	3.00-6.00	0.144

Source: Author

The sample exhibited high levels of all personality traits (measured on a 1–5 scale). For example, extraversion shows a mean (M) of 4.177, indicating most participants rated themselves as outgoing. Also, an SD (standard deviation) of 0.753 shows less variability in their response. $\alpha = 0.792$ is high and reflects strong internal consistency of the scale. Similarly, agreeableness (M = 3.892, SD = 0.688, $\alpha = 0.657$), too, reflects high levels of the trait, slightly more variation in the sample, and moderate scale reliability. Conscientiousness (M = 3.984, SD = 0.678, $\alpha = 0.686$) indicates that respondents rated themselves slightly lower on this factor and had low variability in their responses. However, the scale's internal consistency was moderate to high. Neuroticism (M = 4.281, SD = 0.748, $\alpha = 0.834$) showed the highest mean, which is suggestive of respondents indicating a higher level of emotional instability and low variability in their response. The Cronbach alpha value suggests high consistency. Openness (M = 4.096, SD = 0.649, $\alpha = 0.696$) also has a high mean, low variability, and moderate to high consistency. Additionally, while all personality factors have negative skewness, neuroticism showed the highest skewness (-1.673), suggesting that the majority of the participants reported a higher level of this trait.

Similarly, SI (measured on a 1–4 scale that scores reverse) has a lower mean (M = 1.740, SD = 0.701, $\alpha = 0.836$) and a positive skew (0.731), indicating that most participants reported higher levels of social interaction, moderate to high variability in responses, and high internal consistency. In contrast, knowledge-related behaviors (assessed on a 1–6 scale) indicate a high mean for both KG (M = 5.070, SD = 0.219, $\alpha = 0.845$) and KA (M = 5.074, SD = 0.239, $\alpha = 0.858$), with minimal skewness (0.072 and 0.144, respectively), reflecting consistently high scores across respondents. Overall, the internal consistency (Cronbach's alpha) for all the variables is acceptable ($\alpha > 0.5$), as depicted in Table 2 below.

Table 2. Cronbach Alpha Reliability Test

Variables	α
Extraversion (E)	0.792
Agreeableness (A)	0.657
Conscientiousness (C)	0.686
Neuroticism (N)	0.834
Openness (O)	0.696
Social interaction (SI)	0.836
Knowledge giving	0.845

(KG)

Knowledge asking

(KA)

0.858

Source: Author

5.3 Relationships between Personality, Social Interaction, Education, and KSB

5.3.1 Correlation Analysis

Table 3. Pearson Correlation Matrix

Variables	E	A	C	N	O	SI	KG	KA	Edu
Extroversion (E)	1.00	0.81	0.40	0.29	0.84	0.57	0.14	0.10	0.02
Agreeableness (A)	0.81	1.00	0.52	0.51	0.75	0.59	0.09	0.14	0.04
Conscientiousness (C)	0.40	0.52	1.00	0.79	0.51	-0.15	-0.10	-0.06	0.14
Neuroticism (N)	0.49	0.51	0.79	1.00	0.63	-0.14	-0.12	-0.15	0.09
Openness (O)	0.84	0.75	0.51	0.63	1.00	0.58	0.09	0.05	0.03
Social Interaction (SI)	0.57	0.59	0.03	-0.14	0.58	1.00	0.12	0.42	0.01
Knowledge Giving (KG)	0.14	0.09	-0.10	-0.20	0.09	0.12	1.00	-0.56	-0.01
Knowledge Asking (KA)	0.10	0.14	-0.06	-0.15	0.05	0.42	0.56	1.00	-0.05
Education	0.02	0.04	0.14	0.09	0.03	0.01	0.01	0.05	1.00

Source: Author

The findings indicate that all personality factors are correlated positively with each other, though extraversion, agreeableness, and openness show a consistent high correlation. Further, SI has a positive correlation with traits like extraversion ($r = 0.57$), agreeableness ($r = 0.59$), and openness ($r = 0.58$), a negative correlation with neuroticism ($r = -0.14$), while a negligible one with conscientiousness ($r = 0.03$). These findings suggest that some of the personality factors and social interaction are likely to be linked, though at this stage it is difficult to determine a cause-and-effect relationship. Also, SI shows a moderate positive correlation with KA ($r = 0.42$) and a negligible positive relationship with KG ($r = 0.12$). SI also shows a weak positive relationship with education. These findings suggest that social interaction and knowledge asking may be linked, while social interaction and knowledge giving may only be weakly connected.

The correlation analysis shows that extraversion (KG $r = 0.14$; KA $r = 0.10$), agreeableness (KG $r = 0.09$; KA $r = 0.14$), and openness (KG $r = 0.09$; KA $r = 0.05$) are modestly to weakly correlated with knowledge sharing behaviors, with the strongest relationship between extraversion and KG and agreeableness and KA.

Additionally, it is also seen that conscientiousness (KG $r = -0.10$, and KA $r = -0.06$), and neuroticism (KG $r = -0.20$, and KA $r = -0.15$) are negatively correlated with KSB. The findings from neuroticism are easily explained as such individuals may be high on emotional instability or anxiety and are likely not to feel safe or trusting. Hence, this is reflected in their KSB behaviors (Guo et al., 2021). The negative correlation with conscientiousness needs further exploration; this trait may imply several

aspects, like the need to conform to authority, where the students feel they need to focus on their work, or where they may think it's unethical to share their knowledge. The Pearson correlation matrix has provided a basic understanding of the direction of the relationships, though to test the research hypothesis, regression analysis is used to assess the relationship between the variables.

5.3.2 Impact of Personality Factors on KSB

The following Table 4 presents the results of the regression analysis to show the relationship between personality factors and KSB. Please note that, to evaluate the strength of relationships in this study, the following thresholds were used for interpreting the regression coefficients: the unstandardized coefficient (B) is considered to indicate a weak relationship if its absolute value ($|B|$) < 0.1 , a moderate relationship $0.1 < |B| < 0.3$, and a strong relationship if $|B| > 0.3$. The standard error (SE) is assessed relative to the magnitude of B; a low SE suggests a precise estimate, and a large SE indicates reduced reliability of the coefficient. For the standardized coefficient (β), it is interpreted as weak if $|\beta| < 0.1$, moderate if $0.1 < |\beta| < 0.3$, and strong if $|\beta| > 0.3$.

Table 4. Impact of Personality Factors on KSB

Variables	Knowledge Giving B	Knowledge Giving SE	Knowledge Giving β	Knowledge Asking B	Knowledge Asking SE	Knowledge Asking β
Constant	4.987	0.184	27.079	4.970	0.179	27.696
Extraversion	0.153	0.076	1.998	0.045	0.074	0.610
Agreeableness	0.004	0.070	0.057	0.170	0.068	2.491
Conscientiousness	-0.018	0.066	-0.271	0.050	0.064	0.774
Neuroticism	-0.144	0.063	-2.275	-0.206	0.062	-3.338
Openness	0.009	0.084	0.111	-0.039	0.082	-0.474

Source: Author

Table 4 above shows that extraversion positively impacts both KG ($B = 0.153$, $\beta = 1.998$) and KA ($B = 0.045$, $\beta = 0.610$) behaviors, suggesting that high extraversion personalities engage in more KSB due to their outgoing nature.

The trait agreeableness had a minor impact on KG ($B = 0.004$, $\beta = 0.057$), but a high impact on KA ($B = 0.170$, $\beta = 2.491$) behaviors, indicating that agreeable people are likely more open to asking for knowledge than ready to provide it.

Conscientiousness had a slight negative impact on KG ($B = -0.018$, $\beta = -0.271$) but a weak positive relationship with KA ($B = 0.050$, $\beta = 0.774$) behaviors, which conforms with the findings on the correlation analysis (See Table 3 above). These results may indicate that highly conscientious individuals are likely to be focused on personal achievements and may seek information for themselves, but may not be open to giving the same.

Neuroticism showed a significant negative impact on both KA ($B = -0.144$, $\beta = -2.275$) and KB ($B = -0.206$, $\beta = -3.338$) behaviors, underscoring the negative impact of emotional instability on KSB. Similar findings have been suggested in previous studies, where individuals high on neuroticism are found to avoid KSB because of anxiety, fear of judgment, or discomfort (Back, 2021; Mehl et al., 2006).

Openness is seen to have a negligible positive effect on KG ($B = 0.009$, $\beta = 0.111$) and a slight negative effect on KA ($B = -0.039$, $\beta = -0.474$). While openness is often associated with creativity and intellectual curiosity (Guo et al., 2021), the current study results vary from this. A plausible explanation could be that open people may still not be inclined to ask for knowledge if they do not perceive the environment to be supportive, or if they operate in a strictly hierarchical environment.

The results show that personality traits significantly influence knowledge-sharing behaviors, specifically traits like extraversion and agreeableness (which impact positively), and neuroticism (which impacts negatively). Conscientiousness and openness show a lesser effect and also suggest the existence of additional facilitative factors that may be explored in further studies. Nevertheless, the first research hypothesis, *H1: "Personality impacts knowledge-sharing behaviors*, is supported by the analysis.

5.3.3 Impact of SI on KSB

Table 5. Impact of SI on KSB

Variables	KG B	KG SE	KG β	KG ΔR^2	KA B	KA SE	KA β	KA ΔR^2
Constant	4.884				4.993			
Social Interaction	-0.010	0.037	-0.264	0.107	0.060	0.051	1.617	0.792

Source: Author

Table 5 above shows that for KA (B = 0.060, SE = 0.051, β = 1.617), SI has a modest positive impact. However, for KG (B = -0.010, SE = 0.037, and β = -0.264), SI seems to have a non-significant negative impact. A constant value of 4.884 and 4.993 suggests that KG and KA still occur when SI is at its lowest. The changes in R² (ΔR^2) values for both KG (0.107) and KA (0.792) show that the degree of variance (10.7% and 79.2% respectively) can be explained by SI. The findings therefore suggest that *H2: Social Interaction impacts knowledge-sharing behaviors* is partially acceptable.

5.3.4 Impact of SI on Personality

Table 6 below shows the results of the regression analysis of SI and Personality factors.

Table 6. Impact of SI on Personality

Trait	B (Social Interaction)	SE	β	R ²	p-value
Constant	4.39				
Extraversion	0.196	0.122	0.277	0.031	0.01
Agreeableness	0.052	0.103	0.142	0.031	0.074
Conscientiousness	-0.030	0.025	-0.112	0.031	0.129
Neuroticism	-0.089	0.021	-0.297	0.031	0.019
Openness	0.016	0.027	0.168	0.031	0.026

Source: Author

The results show that SI significantly impacts extraversion (B = 0.196, SE = 0.122, β = 0.2737), with $p < 0.05$ (p = 0.01). This suggests that as social interaction increases, extraversion also increases. For agreeableness, the unstandardized coefficient is B = 0.052, SE = 0.103, β = 0.142, and p = 0.074, which is $> p = 0.05$, and as such, the impact of SI on agreeableness is not significant. Similarly, conscientiousness (B = -0.034, SE = 0.025, and β = -0.112) indicates a negative relationship with SI, but since p = 0.129 ($p > 0.05$), the relationship is not statistically significant. Neuroticism (B = -0.089, SE = 0.021, β = -0.297) has a p = 0.019 ($p < 0.05$). The negative relationship is statistically significant. For Openness, the findings are B = 0.016, SE = 0.027, β = 0.168, and p = 0.026 ($p < 0.05$). These findings indicate that increased SI corresponds with higher levels of openness.

A constant value of 4.30 indicates that personality is also dependent on other factors, which may be operational even when there is no SI.

Thus, hypothesis *H3: Social Interaction (SI) Impacts Personality in Students in Higher Education* is partially supported, as some personality traits like extraversion and openness are probably enhanced in individuals who have high social interaction, and traits like neuroticism may be lowered in individuals who show high SI. However, agreeableness and conscientiousness do not show a significant impact on SI.

5.3.5 Impact of Education Level on KSB

Next, the research also evaluated the impact of education level on KSB, and the findings are presented in Table 7 below.

Table 7. Impact of Education Level on KSB

Variables	KG B	KG SE	KG β	KG ΔR^2	KA B	KA SE	KA β	KA ΔR^2
Constant	4.97				4.90			
Education	0.0095	0.040	0.0207	0.00018	0.0345	0.040	0.077	0.00250

Source: Author

The results suggest a weak impact of education level on both dimensions of KSB. For KSB, the coefficient (B) is 0.0095, the standard error (SE) is 0.040, and the standardized coefficient (β) is 0.0207, suggesting a negligible positive impact of education on KG. The ΔR^2 of 0.00018 further implies that education explains only 0.018% of the variance in KG. The constant of 4.97 suggests that KSB has a high baseline even when the education level is not a factor.

Similarly, for KA (B = 0.0345; SE = 0.040; β = 0.077), which suggests a slightly stronger impact of education on KA than on KG. The ΔR^2 of 0.00250 indicates that education can explain 0.25% of the variance in KA, and further, a constant value of 4.9 again suggests that the baseline of KA is still high without the impact of education. The findings, therefore, indicate that the education level may not have a large impact, especially on KG behaviors.

Overall, the findings suggest that education level has minimal influence on KSB among students, with neither KG nor KA being significantly impacted. Nevertheless, a weak relationship is established, and hence *H4: Education Level has an Impact on KSB*, is accepted.

5.4 SI as a Moderator

5.4.1 SI as a Moderator Between Personality and KSB

Next, the impact of SI on the relationship between Personality and KSB was studied using the multiple regression analysis, the results being depicted in the following Table 8.

Table 8. SI as a Moderator Between Personality and KSB.

Dependent Variable	Personality Factor	B (Personality)	B (SI)	B (Interaction)	SE (Interaction)	p-value (Interaction)	R ²
Knowledge Giving	Extraversion	0.202	0.434	0.041	0.079	0.038	0.030
Knowledge Asking	Extraversion	0.124	0.153	0.115	0.052	0.027	0.035
Knowledge Giving	Agreeableness	0.041	0.152	0.045	0.082	0.544	0.000
Knowledge Asking	Agreeableness	0.003	-0.279	0.076	0.053	0.041	0.010

Knowledge Giving	Conscientiousness	-0.121	-0.085	-0.017	0.086	0.844	0.009
Knowledge Asking	Conscientiousness	-0.005	0.100	-0.032	0.057	0.574	0.006
Knowledge Giving	Neuroticism	-0.065	0.051	-0.018	0.073	0.803	0.009
Knowledge Asking	Neuroticism	0.021	0.304	-0.084	0.048	0.078	0.033
Knowledge Giving	Openness	0.098	0.271	-0.074	0.092	0.422	0.002
Knowledge Asking	Openness	0.027	0.000	-0.003	0.060	0.963	0.002

Source: Author

The findings indicate that SI impacts differently on the relationships between individual personality factors and components of KSB. As seen in Table 8 above, for **extraversion**, the interaction term was statistically significant for both KG ($B = 0.041$, $SE = 0.079$, $p = 0.038$) and KA ($B = 0.115$, $SE = 0.052$, $p = 0.027$). Also, $R^2=0.030$ for KG, and $R^2=0.035$ for KA indicate that SI is responsible for 3.0% and 3.5% variations for KG and KA, respectively, caused by extraversion. The findings, therefore, indicate that SI significantly moderates the relationship between extraversion and KSB.

In contrast, for **agreeableness**, the interaction term was significant for KA ($B = 0.076$, $SE = 0.053$, $p = 0.04$) but not for KG ($B = 0.045$, $SE = 0.082$, $p = 0.54$) due to $p>0.05$ in the latter case. Also, $R^2=0.010$ for KA suggests that SI impacts only 1.0 %, and for KG ($R^2 = 0.00$), it suggests no variation can be attributed to the presence of SI.

Similarly, for **conscientiousness**, **neuroticism**, and **openness**, the interaction terms were not statistically significant ($p>0.05$ for all three personality traits) for both KG and KA, with R^2 values ranging from 0.002 to 0.033, suggesting their little contribution in explaining the variance in KSB. It also needs to be noted that while not significant, SI harms the relationship between neuroticism and both KG ($B = -0.018$, $SE = 0.073$, $p = 0.803$) and KA ($B = -0.084$, $SE = 0.048$, $p = 0.078$) behaviors, suggesting people high on neuroticism may further refrain from KSB if their SI is increased. A similar impact of SI is found on the relationship between conscientiousness where, for KG, $B = -0.017$, $SE = 0.086$, $p = 0.844$; and for KA, $B = -0.032$, $SE = 0.057$, $p = 0.574$; and for openness (KG: $B = -0.074$, $SE = 0.092$, $p = 0.422$); KA ($B = -0.003$, $SE = 0.060$, $p = 0.963$).

As such, the hypothesis, *H5: Social Interaction (SI) moderates the relationship between personality and knowledge-sharing behaviors*, is acceptable, but only for extraversion and agreeableness.

5.4.2 SI as a Moderator Between Education Level and KSB.

The moderating role of SI for the relationship between education level and KSB was evaluated using regression analysis, and Table 9 below contains the findings.

Table 9: SI as a Moderator Between Education Level and KSB

Dependent Variable	B (Education)	B (SI)	B (Interaction)	SE (Interaction)	p-value (Interaction)	R ²
Knowledge Giving	0.110	0.043	-0.044	0.056	0.430	0.011
Knowledge Asking	0.056	0.032	0.009	0.055	0.036	0.281

Source: Author

For KG, the coefficient for the interaction term ($B = -0.044$) and a standard error of $SE = 0.056$, and $p>0.05$ ($p = 0.430$) suggest a statistically insignificant relationship. The model explains only 1.1% of the variance, as suggested by $R^2=0.011$, and thus, it can be said that SI does not significantly moderate the relationship between education and KG.

For KA, the interaction term had a coefficient of $B = 0.009$ and $SE = 0.055$, and $p<0.05$ ($p = 0.036$), which suggests a statistically significant relationship. The model, however, explains only 2.8% of the variance ($R^2 = 0.028$). As such, *H6: SI moderates the relationship between education and KSB is accepted*.

6. Discussion

While the study aimed to understand the perspective of all students from higher education, the sample was biased against post-graduate students, and as such, the findings may be more applicable to the undergraduate and graduate students who are predominantly under 20 years of age. The sample was also slightly biased toward female students, who made up 53.3%. As seen from the descriptive statistics, the majority of students scored high on all personality traits, and there was less variability in their responses. Also, the majority of the students scored lower on the Social Interaction scale (as it was reversed, this means they scored high on social interaction). A similar trend was observed for KSBs. The findings therefore suggest that the students perceived themselves as being socially interactive and also indulging in KSBs. However, as the aim of the research was to understand the relationship between social interaction and personality factors and KSB, further analysis was conducted.

6.1 Personality and KSB

The correlation analysis (See Table 3) revealed that extraversion showed a higher correlation with KG than with KA, while agreeableness correlated more with KA than with KG. The strongest relationship was found between extraversion and KG and agreeableness and KA, indicating that extraverts may be more inclined to give than receive information, while agreeable people are likely to ask for and receive more. Additionally, it is also seen that conscientiousness and neuroticism are negatively correlated with KSB. People high on neuroticism may not indulge in either of the KSB behaviors, while conscientious people may be too focused on themselves or unsure whether KSBs are approved by the authorities or not. The findings from neuroticism are easily explained as such individuals may be high on emotional instability or anxiety and are likely not to feel safe or trusting. Hence, this is reflected in their KSB behaviors (Guo et al., 2021). The negative correlation with conscientiousness needs further exploration; probably as this trait may imply several aspects, like the need to conform to authority, where the students feel they need to focus on their work, or where they may think it's unethical to share their knowledge. Also, openness showed a weak correlation with either of KSBs, which appeared counterintuitive at this stage, as open people may be expected to be more open to the idea of knowledge sharing. However, open people may still hesitate in indulging in KSB due to a non-supportive or hierarchical environment.

To delve deeper, the regression analysis (see Table 4) showed a similar pattern, with extraversion positively impacting both KG and KA, and openness not showing a significant impact. Agreeableness leads to, and not knowledge giving. Previous studies have nevertheless linked extraversion, openness, and agreeableness with KSB (For example, being open to experiences (Mammadov, 2022; Munasinghe, 2019), extraversion (Al Husaini et al., 2024), and agreeableness (Farrukh et al., 2020; Nishanthi and Munasinghe, 2020) have been associated with KSB among students). However, the current study indicates that agreeable people are likely to seek information rather than give; probably, their personality encourages people to give knowledge easily, while they may not have the confidence to share their knowledge. More in-depth study of the phenomenon is therefore indicated. Similarly, while openness is linked to KSB in earlier studies, the current study shows only a weak relationship, which can be explained by the fact that people who are open to new experiences may be inhibited from sharing knowledge due to extraneous or environmental factors like perceived lack of structural or institutional facilitators, or lack of approval for such sharing. Again, a more in-depth study of the subject is suggested by the current findings.

Neuroticism displayed a significant negative impact on both KG and KA. However, for conscientiousness, while the negative link with KG persisted, there was a slight positive impact of conscientiousness on KA, suggesting that conscientious people may be self-focused and indulge in seeking behaviors for their benefit. These findings also conform to the previous studies that have found an ambiguous impact of conscientiousness on KSB (Munasinghe, 2019), where conscientious

students were reported to be self-focused and not interested in sharing. Also, neuroticism has been reported to lead to lower KSB due to a lack of emotional stability or anxiety of being criticised (Munasinghe, 2019). Previous studies have also suggested several mitigating factors between personality and KSB. For example, trust can lower the impact of neuroticism and enhance KSB (Alnaimi and Rjoub, 2021), while individualistic cultures may inhibit agreeableness and prevent KSB (Al Husaini et al., 2024). The current study was nevertheless conducted in a global context, and as such, any impact of culture was not studied separately.

Thus, the hypothesis, *H1: Personality impacts knowledge-sharing behaviors, is supported by the analysis.*

6.2 SI and KSB

The findings showed SI as positively correlated with KA ($r = 0.42$) but a low positive relationship with KG ($r = 0.12$) (See Table 3). The relationship was further explored by regression analysis (See Table 5), which revealed a similar positive impact of SI on KA ($B = 0.060$, $SE = 0.051$, $\beta = 1.617$), but a negligible negative impact on KG ($B = -0.010$, $SE = 0.037$, and $\beta = -0.264$). So, while the research hypothesis 2 (*H2: Social Interaction impacts knowledge-sharing behaviors*) was accepted, the findings warrant further exploration. Most previous studies have only indirectly linked social interaction with KSB (for example, Nguyen et al. and Yu et al. suggest meaningful and frequent interaction enhances trust, which is likely to lead to KSB) (Nguyen et al., 2021; Yu et al., 2021); while Obrenovic et al. link meaningful social interactions to the display of altruistic behavior which may lead to KSB (Obrenovic et al., 2020). The current study is one of its kind to evaluate the direct impact of social interaction on components of KSB, and as such, paves the path for future studies using more expansive or diverse samples. The finding that SI has a greater impact on KA than on KG suggests that students, when encouraged to socially interact, are likely to seek more knowledge easily. However, social interaction may not encourage or even inhibit knowledge giving due to factors like lack of self-efficacy, lack of confidence, fear of being inaccurate, or other inhibitions. However, more research is needed, and future studies should focus on further exploration.

6.3 SI and Personality

A preliminary Pearson's Coefficient analysis (See Table 3) revealed that SI was positively correlated with extraversion ($r = 0.57$), agreeableness ($r = 0.59$), and openness ($r = 0.58$), and negatively with neuroticism ($r = -0.14$), while it showed no relationship with conscientiousness ($r = 0.03$). (See Table 3.) Further, regression analysis (See Table 6) revealed that SI significantly affects extraversion and openness, but not with agreeableness or conscientiousness. However, the SI significantly and negatively impacted neuroticism, suggesting that meaningful and positive social interactions may lower neuroticism. The findings suggest that students who indulge in high social interaction are likely to enhance their extraversion and openness traits. This conforms to what is known theoretically about learning and behavior modelling, as social learning theories suggest people learn by observation and interaction (Bandura, 1977). Also, the findings seem to support the contention by implying that personality may not be a fixed trait, and is rather open to change with social interaction (Roberts and DelVecchio, 2000). Similar findings have been reported in the literature where positive peer relationships were reported to lead to improvements in traits like extraversion and agreeableness, while negative interactions were found to add to neuroticism (Back, 2021; Mehl et al., 2006). This also conforms to the earlier neuroscience studies that have found structural changes in the brain as a result of social interactions and leading to positive outcomes for personality development (Davidson, 2004). The current research, therefore, accepts hypothesis 3 (*H3: SI Impacts Personality in Students in Higher Education*).

6.4 Education and KSB

Correlation analysis had shown a very weak relationship between education and KG ($r = 0.01$) and KA ($r = 0.05$) (See Table 3). The regression analysis, too, found that education had a weak impact for both KG ($B = 0.0095$; $SE = 0.040$; $\beta = 0.0207$) and KA ($B = 0.0345$; $SE = 0.040$; $\beta = 0.077$). (See Table 7). As seen from the literature, there is a lack of studies comparing the impact of different educational levels on KSB (Rahman et al., 2014), and the current research fills this gap by showing the existence of a relationship, even if it's a weak one, between education level and KSB, especially KA. As such, hypothesis 4 (*H4: Education level impacts KSB among students*) was also accepted.

6.5 SI, Personality and KSB

The findings indicate a positive and significant impact of SI on the relationship between extraversion for both KG ($B = 0.041$, $SE = 0.079$, $p = 0.038$) and KA ($B = 0.115$, $SE = 0.052$, $p = 0.027$), with the relationship being stronger for KA (See Table 8). This is consistent with the findings from the regression analysis between extraversion and KSB, where this trait was found to have a positive effect on both components of KSB (See Table 4). Also, as seen from Table 3, extraversion had correlated moderately with both KG ($r = 0.14$) and KA ($r = 0.10$). Also, as seen from Table 6, SI significantly impacts extraversion ($B = 0.196$, $SE = 0.122$, $\beta = 0.2737$).

These findings suggest that the benefits of extraversion (in the form of KSB) are likely to be enhanced if such individuals are provided with greater opportunities for social interaction.

Also, a significant and positive impact of SI on the relationship between agreeableness and KA ($B = 0.076$, $SE = 0.053$, $p = 0.04$) but not for KG ($B = 0.045$, $SE = 0.082$, $p = 0.54$) (See Table 8). This also extends the findings from Table 4, where agreeableness had shown a significant impact on KA behavior, and earlier when agreeableness correlated more strongly with KA ($r = 0.14$) than with KG ($r = 0.09$) (See Table 3). These findings are interesting as they suggest that agreeable individuals may improve KA if they are provided with opportunities to socially interact, but the same may not encourage them to give knowledge. This suggests there may be additional factors operational that may prevent people from giving information, and as suggested in previous research, could be linked to self-efficacy or lack of confidence, or fear of being shamed (Nguyen et al. 2021; Yu et al., 2021). The research findings, therefore, underscore the need for further exploration.

It was also found that SI had a negative, though insignificant, impact on the relationship between neuroticism and both KG ($B = -0.018$, $SE = 0.073$, $p = 0.803$) and KA ($B = -0.084$, $SE = 0.048$, $p = 0.078$). (See Table 8). This is consistent with the correlation matrix shown in Table 3, where neuroticism showed $r = -0.12$ and $r = -0.15$ for KG and KA, respectively. Also, neuroticism had shown a significant negative impact on both KG and KA (Table 4). While the relationship is not significant, it may suggest that enhanced opportunities of SI may weaken the relationship between neuroticism and KSB, which can be further extended to mean that the negative impact of neuroticism on KSB (as seen in Tables 3 and 4) can be mitigated if individuals are allowed to interact more. This is an interesting direction that can be further explored in future studies.

A similar insignificant negative impact of SI is found on the relationship between conscientiousness KG ($B = -0.017$, $SE = 0.086$, $p = 0.844$) and slightly more pronounced for KA ($B = -0.032$, $SE = 0.057$, $p = 0.574$). The negative impact suggests that SI lowers the strength of the relationship between conscientiousness and KSB behaviors, but more so for KA (See Table 8). Since conscientiousness already showed a negative effect on KG ($B = -0.018$, $\beta = -0.271$) and a slight positive effect on KA ($B = 0.050$, $\beta = 0.774$) (See Table 4), the presence of SI translates into lowering the negative effect of conscientiousness on KG, and also lowers the positive effect of conscientiousness on KA. These findings may appear counterintuitive, but can be explained by understanding that conscientious individuals are likely to be self-focused and self-centered, and may not indulge in KG, but still may want to ask for knowledge if it supports their goals or enhances their competitiveness. However, when SI increases for them, they are likely to moderate and adapt their behavior, and increase their effort

to give knowledge, and not just seek it. These findings add a further explanation to the findings from previous studies that have largely reported an ambiguous impact of conscientiousness on KSB (Munasinghe, 2019).

The findings also reveal that SI appears to have an insignificant negative impact on the relationship between openness and KG ($B = -0.074$, $SE = 0.092$, $p = 0.42$) and KA ($B = -0.003$, $SE = 0.060$, $p = 0.963$) (See Table 8). While openness had moderately and positively correlated with both KG ($r = 0.09$) and KA ($r = 0.05$) (See Table 3), it had showed a negligible positive effect on KG ($B = 0.009$, $\beta = 0.111$) and a slight negative effect on KA ($B = -0.039$, $\beta = -0.474$) (See Table 4), suggesting the impact of additional extraneous factors that may have correlated with both openness and KSB constructs. However, the findings suggest that SI is likely to lower the negative effect of openness on KA, suggesting that individuals high on openness, who may have felt inhibited from asking due to a lack of structural or institutional support, are still likely to take the opportunity to indulge in KA if SI is enhanced. However, the same is not the case with KG behavior, where people high on openness appear to reduce their KG when facing higher levels of SI. This can be explained by the lack of motivation or positive mandate from the authorities that could be restrictive of knowledge sharing, and may prevent people from sharing even when they interact socially.

The findings also need to be understood in the light of the findings related to SI impact on KSB (See Table 5), where it was found that SI has a significant positive effect only on KA ($B = 0.060$, $SE = 0.051$, $\beta = 1.617$) and not on KG; that impact of SI on KG ($B = -0.010$, $SE = 0.037$, and $\beta = -0.264$) was found to be in a negative direction. It is likely that SI dampens the strength of the relationship between personality factors and KG, but enhances their impact on KA. It is also plausible that individuals may indulge in social interactions to seek knowledge rather than give knowledge, which is what is being reflected in the current findings.

Nevertheless, as the findings can be summarized in Table 10 below, the hypothesis *H5: Social Interaction (SI) moderates the relationship between personality and knowledge-sharing behaviors*, is acceptable, but only for extraversion and agreeableness.

Table 10. Summary of the Impact of SI on the Relationship between Personality Factors and KSB

		KA		KG
Extraversion	+	(significant)	+	(significant)
Agreeableness	+	(significant)	-	(insignificant)
Neuroticism	-	(insignificant)	-	(insignificant)
Conscientiousness	-	(insignificant)	-	(insignificant)
Openness	-	(insignificant)	-	(insignificant)

While there are a few studies that have found positive and moderating impact of SI on individuals' absorptive capacity and KSB (Nguyen et al. 2021) or suggest how extrovert individuals may thrive in situations of high SI and share knowledge (Back, 2021), they do not differentiate between KA and KG, or delve into specific dynamics that may be operant in the situation. The current study has filled this gap and also provided a specific and in-depth understanding of the role played by SI as a moderator between specific personality traits and KA and KG.

6.6 SI, Education Level, and KSB

The research also explored the impact of SI on the relationship between education level and KSB. It was found that the SI did not significantly moderate the relationship of education level with KG ($B = -0.044$, $SE = 0.056$, $p = 0.430$ ($p > 0.05$)), but moderated it for KA ($B = 0.009$, $SE = 0.055$; $p = 0.036$ ($p < 0.05$)). It was also seen that only 1.1% ($R^2 = 0.011$), and only 2.8% ($R^2 = 0.028$) of variance in the relationship between education level and KG and KA can be explained by SI (See Table 9). As such, *H6: SI moderates the relationship between education and KSB* is accepted for KA. These findings are in continuation of the earlier findings where education level had exhibited a low correlation with both KA ($r = 0.05$) and KB ($r = 0.01$), but relatively higher for KA than KG (see Table 3). Further, education had also displayed a weak positive and insignificant correlation on KG ($B = 0.0095$, $SE = 0.040$, $\beta = 0.0207$), and a moderate positive impact on KA ($B = 0.0345$; $SE = 0.040$; $\beta = 0.077$) (See Table 7). These findings suggest that with higher levels of education, knowledge asking behavior may improve, most likely with an increase in confidence level with age.

Social interaction is reported to vary at different educational levels, with SI being more structured and formally guided by the institution at the lower levels, and being more voluntary and mentorship-based at the higher levels (Rahman et al., 2014; Majid and Wey, 2009). Also, the connection between education level and KA is noted from the findings of this study, and SI moderately impacts this relationship (See Table 9). As such, the hypothesis, *H6: Social Interaction (SI) moderates the relationship between education level and knowledge-sharing behaviors*, is accepted.

These results suggest that by improving SI, it is reasonable to believe that students will improve their knowledge and asking behaviors at all educational levels, with the undergraduate students benefiting most, as their interactions are mostly guided by institutional and structural processes.

7. Conclusions and Implications

The research found that extraversion impacts both KG and KA, while agreeableness and openness impact only KA. Also, neuroticism and conscientiousness lower both KG and KA. Additionally, education level has a minor, if any, impact on KA, though SI has been shown to impact KA significantly, but negatively on KG. It can be concluded that SI improves KA, but may reduce KG, while a higher educational level generally improves KA behaviours. The findings get interesting when the moderating impact of SI is studied, where it is found that SI significantly affects only extraversion and neuroticism, with enhanced SI improving extroverted students' KA, and lowering the inhibitions of individuals high in neuroticism to ask for knowledge.

These findings have significant implications for both academic and practical settings. The fact that independent personality factors have different impacts on KSB, and SI moderates these relationships, needs to be further explored, especially to discuss the differences in KA and KG. The research has shown a consistent leaning of students toward KA, rather than KG, even for students who are agreeable or open, which indicates that even students who are likely to be sociable and amiable are more inclined to seek knowledge than give. This may imply the presence of additional inhibitory factors for KG, which could be rooted in institutional or structural limitations or personal contexts of the students, and future research is needed to explore them further. Further, the current research also found a tangible impact of education level on KSB and SI on the relationship between educational level and KSB, which suggests that improving SI at different educational levels may lead to enhanced KSB. Nevertheless, more research is needed to explore how SI can be improved, from structured and controlled at the undergraduate level to encourage more interactive teamwork and opportunities for sharing knowledge. As such, the current study paves the path for future research to explore novel directions related to KSB literature.

Practical implications include providing insights for educational administrators and practitioners to develop more opportunities for social interaction to encourage students' KSB at varying educational levels.

8. Limitations

The research uses an online survey approach that requires respondents to self-report, which is known to have some limitations, like a lack of accountability in filling out responses carefully or errors due to a lack of understanding of the questions. Further, the research uses global data, but it is seen that the resulting sample was skewed toward females and the undergraduate population. The findings may have limited utility when applied in other contexts, and further research may be required with more diverse samples.

Supplementary Materials: Figures

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Abbreviations

The following abbreviations are used in this manuscript:

A	Agreeableness
C	Conscientiousness
E	Extraversion
EL	Education Level
FFM	Five Factor Theory
KA	Knowledge Asking
KG	Knowledge Giving
KSB	Knowledge Sharing Behaviors
M	Mean
N	Neuroticism
SD	Standard Deviation
SET	Social Exchange Theory
SLT	Social Learning Theory
SI	Social Interaction

Appendix A

Big Five Inventory (BFI)

Table A1. Big Five Inventory (BFI)

	I see myself as Someone Who.....	1	2	3	4	5
1	Is talkative					
2	Tends to find fault with others					
3	Does a thorough job					
4	Is depressed, blue					
5	Is original, comes up with new ideas					
6	Is reserved					
7	Is helpful and unselfish with others					
8	Can be somewhat careless					
9	Is relaxed, handles stress well					
10	Is curious about many different things					
11	Is full of energy					
12	Starts quarrels with others					
13	Is a reliable worker					
14	Can be tense					
15	Is ingenious, a deep thinker					
16	Generates a lot of enthusiasm					
17	Has a forgiving nature					
18	Tends to be disorganized					
19	Worries a lot					
20	Has an active imagination					
21	Tends to be quiet					
22	Is generally trusting					
23	Tends to be lazy					
24	Is emotionally stable, not easily upset					
25	Is inventive					
26	Has an assertive personality					
27	Can be cold and aloof					
28	Perseveres until the task is finished					
29	Can be moody					
30	Values artistic, aesthetic experiences					
31	Is sometimes shy, inhibited					
32	Is considerate and kind to almost everyone					
33	Does things efficiently					
34	Remains calm in tense situations					
35	Prefers work that is routine					
36	Is outgoing, sociable					
37	Is sometimes rude to others					
38	Makes plans and follows through with them					
39	Gets nervous easily					
40	Likes to reflect, play with ideas					
41	Has few artistic interests					
42	Likes to cooperate with others					
43	Is easily distracted					

44	Is sophisticated in art, music, or literature
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Appendix B

Social Interaction Questionnaire

Table B1. Social Interaction Questionnaire

		0	1	2	3
1	I am afraid of people in authority				
2	I am bothered by blushing in front of people				
3	Parties and social events scare me				
4	I avoid talking to people I don't know				
5	Being criticized scares me a lot				
6	Fear of embarrassment causes me to avoid doing things or speaking to people.				
7	Sweating in front of people causes me distress				
8	I avoid going to parties				
9	I avoid activities in which I'm the center of attention				
10	Talking to strangers scares me				
11	I avoid having to give speeches				
12	I would do anything to avoid being criticized				
13	I avoid speaking to anyone in authority				
14	I am afraid of doing things when people might be watching				

Appendix C

Knowledge Sharing Behavior Questionnaire

Table C1. Knowledge Sharing Behavior Questionnaire

	Items	1	2	3	4	5	6
1	I teach colleagues strategies that I know						
2	I explain my understanding of information to colleagues						
3	I point out information that may be useful to colleagues						
4	I demonstrate techniques that I know to colleagues						
5	I inform colleagues based on my experience on the job						
6	I communicate new facts I learn to colleagues						
7	I advise colleagues based on what I know						
8	I contribute task information to colleagues						
9	I explain how to perform tasks to colleagues						
10	I ask colleagues to explain their know-how						
11	I ask colleagues to impart lessons they have learned on the job						
12	I ask colleagues to explain strategies they use						
13	I ask colleagues to teach me their expertise						
14	I request work-related information from colleagues						
15	I ask colleagues to communicate what they know from experience						
16	I ask for the insight of my colleagues						
17	I ask my colleagues to explain the way to perform tasks						
18	I request advice from my colleagues based on what they know						

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Ethical approval and informed consent statements

Institutional Review Board Statement: This study was conducted independently and outside the jurisdiction of Zayed University. As it did not involve any direct intervention, medical procedures, or collection of sensitive personal data, it was not subject to Institutional Review Board (IRB) approval. All participants provided informed consent before taking part in the research, and ethical guidelines for social science research were strictly followed.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement:

The data presented in this study are available on request from the corresponding author due to privacy concerns.

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