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Development of Scale to Measure Social Interaction Among University Students

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Abstract

The current study focused on developing and validating a scale to measure social interaction among university students, named SIAA-US. It was constructed based on five main factors: Teacher-student interaction, Academic motivation, Social skills, Teamwork, and Self-esteem. A questionnaire comprising 36 items was designed to assess SIAA-US. After ensuring validity and reliability, 23 statements were retained, scored on a five-point Likert scale. Content validity was established through the judgment of nine experts. Explanatory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted to validate the scale's construct. The validation process resulted in merging the scale into two major factors: interaction and self-esteem. The Cronbach's alpha coefficient indicated excellent internal consistency.

Keywords: *Academic Achievement, Scale Development, Social Interaction, Social Skills*

1. Introduction

Social interaction and academic achievement are both inter related. Social participation encompasses positive social interactions, forming relationships, feeling accepted, and accepting peers (Koster et al., 2009), crucial for children's socio-emotional development (Eriksson and Granlund, 2004; Piskur et al., 2014). Peer interactions foster social skill development (Hay et al., 2004), while isolation and rejection can negatively impact both social and academic adjustment (Hanish and Guerra, 2002; Ladd and Troop Gordon, 2003; Wentzel et al., 2004). Additionally, students' academic achievement influences their social engagement with peers (Nakamoto and Schwantz, 2010; Huber and Wilbert, 2012; Shin and Rayan, 2014; Nepi et al., 2015; Laninga-Wijnen et al., 2018). Socially interactive learners are engaged learners (Vacci et al, 2011).Routman (2005) contends “Students learn more when they are able to talk to one another and be actively involved” (p. 207). Social interaction is vital to the learning process.

The main purpose of conducting the research was to see the relationship between social interaction and academic achievement among university students. Previous researches have been done on school children, elementary school children, collage students and engineering university students. In majority of researches, both these variables (social interaction and academic achievement) have not been studied together. Both the variables were studied with different variables.

There are many types of social interaction but it is seen that two of the sub types is mainly observed among students. Exchange is when individuals, groups and societies interact in an effort to receive a reward for their actions. If you do something for someone, they owe you something in return. The rewards can be in the form of material and non-material. The people are motivated by self-interest and the rewarded behavior tends to be repeated. Cooperation is when two or more people or groups work together to achieve a goal that will benefit many people. This can be used with other forms of interactions as well. A blended version of exchange and cooperation is mostly used by students at university level so that they can improve their behavior and interaction in their own class. Academic achievement is influenced by many factors like individual differences, self-efficacy, motivation, self-control, extra-curricular activities etc. Both the cognitive and the non-cognitive factors affect the academic achievement of a student. The cognitive factors include personality, intelligence, socio economic status, attention span and lastly the working memory of the student. The non-cognitive factors include the person's behavior, attitude and strategies that aid in academic achievement like self-efficacy, self-control, motivation and emotions.

2. Literature Review

This article reviews the literature on social interaction and academic achievement. Both theoretical and empirical works suggest that student social interaction is not only a valued outcome in and of itself but that it can be instrumental in the acquisition of knowledge and the development of cognitive abilities. This review describes research on the value of social interaction for parents and teachers and on how it is promoted within the classroom. It is proposed that social interaction can facilitate learning and performance outcomes by promoting positive interactions with teachers and peers and from a motivational perspective, by providing students with additional incentives to achieve.

Social responsibility has been a distinct educational goal, with research highlighting the unique role of social interaction at universities and its instructional methods. The literature suggests that social interaction and learning are interdependent factors. Socially responsible behavior influences academic achievement in two ways: it facilitates learning by promoting positive interactions with teachers and peers, and students' goals to be compliant and responsible can both constrain and enhance the learning process.

Gillin (1948) define social interaction as the mutual or reciprocal influence resulting in behavior modification through social contact and communication. Dowson and Getty describe it as a process where individuals penetrate each other's minds. Social interaction encompasses exchanges between individuals, forming the basis of social groups. Examples include a teacher instructing a class or an Imam leading prayers, with common forms being exchange, cooperation, and accommodation. Narad and Abdullah (2016) define academic performance as the knowledge assessed by marks and the achievement of educational goals. Classroom systems require adherence to rules and norms for interpersonal conduct, promoting cooperation, respect, and positive participation, which govern social interaction and support academic performance.

Promoting socially responsible behavior, including moral character and cooperation, has traditionally been a valued educational objective (Dreeben, 1968; Jackson, 1968). Educational policies since 1848 have emphasized character development and social responsibility alongside academic skills (Krumboltz et al., 1987). Social responsibility is linked to various aspects of school performance (Lambert & Nicoll, 1977; Mischel, 1961; Parker & Asher, 1987; Wentzel et al., 1990; Wentzel, 1986). Behaving responsibly creates a conducive learning environment, while irresponsible behavior can disrupt it.

Both theoretical and empirical studies suggest that social responsibility is instrumental in acquiring knowledge and developing cognitive abilities. Future research could benefit from examining family socialization practices related to socially responsible behavior and cognitive learning components.

Smith (1998) observed that teachers dominate classroom talk, which contrasts with the philosophy that learning is primarily a social activity (Dewey, 1963; Lindeman, 1926). Active student engagement in social interaction, such as reading, writing, speaking, and thinking, is crucial for learning. Routman (2005) contends that students learn more through active involvement and interaction. Goodman (1986) emphasized integrating reading, writing, listening, and speaking into daily activities, reflecting real-world social interaction. Classrooms should not be zones where teachers talk and students only listen but environments rich in social interaction, is vital for learning.

2.1.The Concept of Social Skills

A number of authors attribute similar meanings to the terms social abilities, social skills, and social competence. However, different stages in the formation of any act range from the lowest level, known as ability, to the highest or automated level, referred to as skill (Jovaiša, 1993; Lepaitė, 2003). A skill is considered the highest level of performance. Masterful application of skills in various situations denotes competence (Jacikevičius, 1994)

According to Lepaitė (2003), the ability to apply skills serves as a connecting link between skills and competence. Each personal competence is closely linked to appropriate social skills and abilities. Social competence spans various domains, including personal relationships, communication, cooperation, self-management, and problem-solving skills. Vaughn and Hogan (1990) identified social competence as encompassing social cognition skills, effective communication, and positive relationships.

2.2.Social Ability

Theoretical analysis indicates that "social ability" is used to denote one of the elements of social activities (Lepaitė, 2003) and the lower level of skills in their developmental stages (Jovaiša, 1993; Lepaitė, 2003).

2.3.Elements of Social Skills

Social skills and their elements, social abilities, manifest in all human social activities (Trotter & Ellison, 2001). Social skills are linked to a person’s ability to initiate interactions and respond appropriately to others' behavior (Gresham, 2002). Cavell (1990) argued that social skills enable behavior that meets social expectations, including overt behavior skills, social cognitive skills, and emotional regulation skills. Authors describe social skills as individual personality traits (trait model), part of behavioral components (molecular model), or intrapersonal and interpersonal abilities. The trait model views social skills as stable and long-lasting personality features, such as empathy and sociability (Nezlek et al., 2001; Lieberman & Rosenthal, 2001).

Malinauskas (2004) identified four essential social skills: emotional expressiveness, emotional sensitivity, social expressiveness, and social sensitivity. Emotional expressiveness includes the need for and attitude toward communication, while emotional sensitivity refers to recognizing others' emotions. Social expressiveness involves both verbal expressiveness and understanding verbal signals, and social sensitivity involves adhering to social rules and norms.

2.4.Skills as Traits

Social skills are defined from intrapersonal (self-awareness, self-evaluation, self-control) and interpersonal perspectives (Raudeliūnaitė, 2007). Stravynski and Amado (2001) described social skills from an intrapersonal perspective as typical behavior in all situations, referring to self-

perception. Goleman (2001) posited that self-perception and cognition of personal emotions are components of emotional intelligence, crucial for understanding and managing emotions in social contexts.

Intrapersonal skills (self-understanding and self-regulation) create the foundation for developing interpersonal skills (understanding others' feelings and moods). Both intrapersonal and interpersonal skills facilitate adequate social interactions. Hogan and Shelton (1998) also described social skills as a level of social awareness and ability to manage social interactions. Social skills act as moderators in regulating interpersonal relations and achieving personal goals (Elijah, 2009). Most authors agree that social skills manifest as appropriate behavior, including the ability to choose actions that align with situational expectations and express emotions without losing social support. These skills involve both verbal and non-verbal reactions, allowing individuals to understand which behaviors will receive social approval (Gresham, 2002).

2.5.Skills in Relation to Communication

Rapee et al. (2000) highlight various social skills that play crucial roles in both nonverbal and verbal communication. These include body language (eye contact, posture, facial expressions), voice quality (tone, pitch, speech pace, clarity), and interaction abilities (greeting, initiating conversations, expressing friendliness, assertiveness, and managing conflicts). Zins et al. (2004) identify components of social skills such as social comprehension (understanding and interpreting social cues), social behavior (building positive relationships and responsible decision-making), and emotion management (recognizing and controlling emotions).

Many authors study social skills as both interpersonal and intrapersonal constructs, though they are not always explicitly categorized this way. Raudeliūnaitė (2007) views intrapersonal skills as encompassing self-awareness, self-evaluation, and self-control, while interpersonal skills include making verbal and nonverbal contact, mutual interaction, and conflict resolution. Bar-On and Parker (2000) add that intrapersonal skills involve self-esteem, emotional self-awareness, assertiveness, independence, and self-realization, whereas interpersonal skills encompass empathy, social responsibility, maintaining relationships, adaptability, reality testing, compliance with rules, problem-solving, stress management, and optimism.

2.6.Components of Social Skills

Several authors identify common elements within social skills:

Self-cognition: The ability to understand and evaluate oneself, including recognizing one’s emotions and fairly assessing one’s strengths and weaknesses (Gailienė et al., 1996; Goleman, 2001). Self-control**:** Skills to manage emotions, cope with stress, control impulses, and motivate oneself to achieve personal and academic goals (Goleman, 2001; Gailienė et al., 1996). Social awareness: Abilities to understand the environment through observation, recognize individual and group differences, understand others' feelings, and navigate social and organizational contexts (Goleman, 2001).

Effective communication**:** Initiating and maintaining positive relationships, expressing oneself appropriately, and managing interactions constructively (Gailienė et al., 1996; Goleman, 2001). Decision-making: Analyzing information and experiences to make rational and optimal decisions, especially in conflict situations (Gailienė et al., 1996; Gevorgianienė, 1999).Bellack et al. (2004) outline components of social skills, including expressive behavior (content of speech, paralinguistic features like speech pace and intonation), nonverbal behavior (eye contact, posture, facial expressions), social perception (attentiveness to and interpretation of social signals), interactive behavior (reaction speed, social encouragement, turn-taking), and situational awareness (understanding and adhering to social norms). In addition to these, Kopelowicz et al. (2006)

emphasize verbal, nonverbal, and paralinguistic abilities; social perception; social information processing and decision-making; normative and situationally appropriate reactions; assertiveness; speech; and emotion control and expression.

2.7.Communication Skills

Communication skills are intricate and multifaceted. They include initiating and maintaining verbal and nonverbal contact (Gevorgianienė, 1999; Rapee et al., 2000; Bellack et al., 2004; Cornish & Ross, 2004; Canney & Byrne, 2006; Raudeliūnaitė & Paigozina, 2009). Nonverbal communication is particularly significant, sometimes substituting verbal communication, especially in cases of speech underdevelopment. Effective communication skills also involve maintaining interpersonal relationships, social expressiveness, flexibility, adaptability, and conflict resolution abilities (Gailienė et al., 1996; Cornish & Ross, 2004; Malinauskas, 2004; Rapee et al., 2000; Goleman, 2001).

The relationship between social interaction and academic achievement is multifaceted, involving various social skills and behaviors. Promoting positive social interactions and social responsibility within university settings can create a supportive learning environment that enhances academic outcomes. Further research is needed to explore specific mechanisms through which social interactions influence academic performance and to develop effective interventions that leverage these insights.

3. Methodology

A questionnaire comprising of closed ended questions had been designed to collect data. The demographic information asked about the program the student was enrolled in, department, semester and GPA. The questionnaire was scored on a five point Likert scale. To make the instruments valid, nine experts from Education was requested to provide their valuable suggestions on the instruments. Data were collected through distribution of google form links by different sources like, mail, WhatsApp groups. Before the distribution of questionnaires the participants were informed about the aim of the study. There were 32 statements and 23 were selected after expert opinion. Moreover, reliability of the instruments were ensured through pilot testing. Content validity index (CVI) is presented in the following table-1:

Table 1: Content Validity Estimate

Item No.	CVR	Item No.	CVR	Item No.	CVR	Item No.	CVR
1	1.00	**7**	.77	**13**	.77	**19**	.77
2	1.00	**8**	1.00	**14**	.77	**20**	1.00
3	1.00	**9**	.77	**15**	1.00	**21**	1.00
4	1.00	**10**	.77	**16**	1.00	**22**	1.00
5	1.00	**11**	1.00	**17**	1.00	**23**	1.00
6	1.00	**12**	1.00	**18**	.77		
CVI=	0.71						

Table 1 presents the Content Validity Ratio (CVR) for each item in a scale developed to measure social interaction among university students. The CVR values range from 0.77 to 1.00 across 23 items. Items 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 15, 16, 17, 18, 21, 22, and 23 achieved a CVR of 1.00, indicating unanimous agreement among experts regarding their essentiality and relevance to the construct. Items 7, 13, 14, and 19 attained a CVR of 0.77, suggesting a slightly lower level of agreement but still considered relevant by the panel. Item 20 also received a CVR of 1.00. The

Cumulative Content Validity Index (CVI) calculated from these values is 0.93, indicating strong overall content validity of the scale.

3.1.Construct validity of SIAA-US

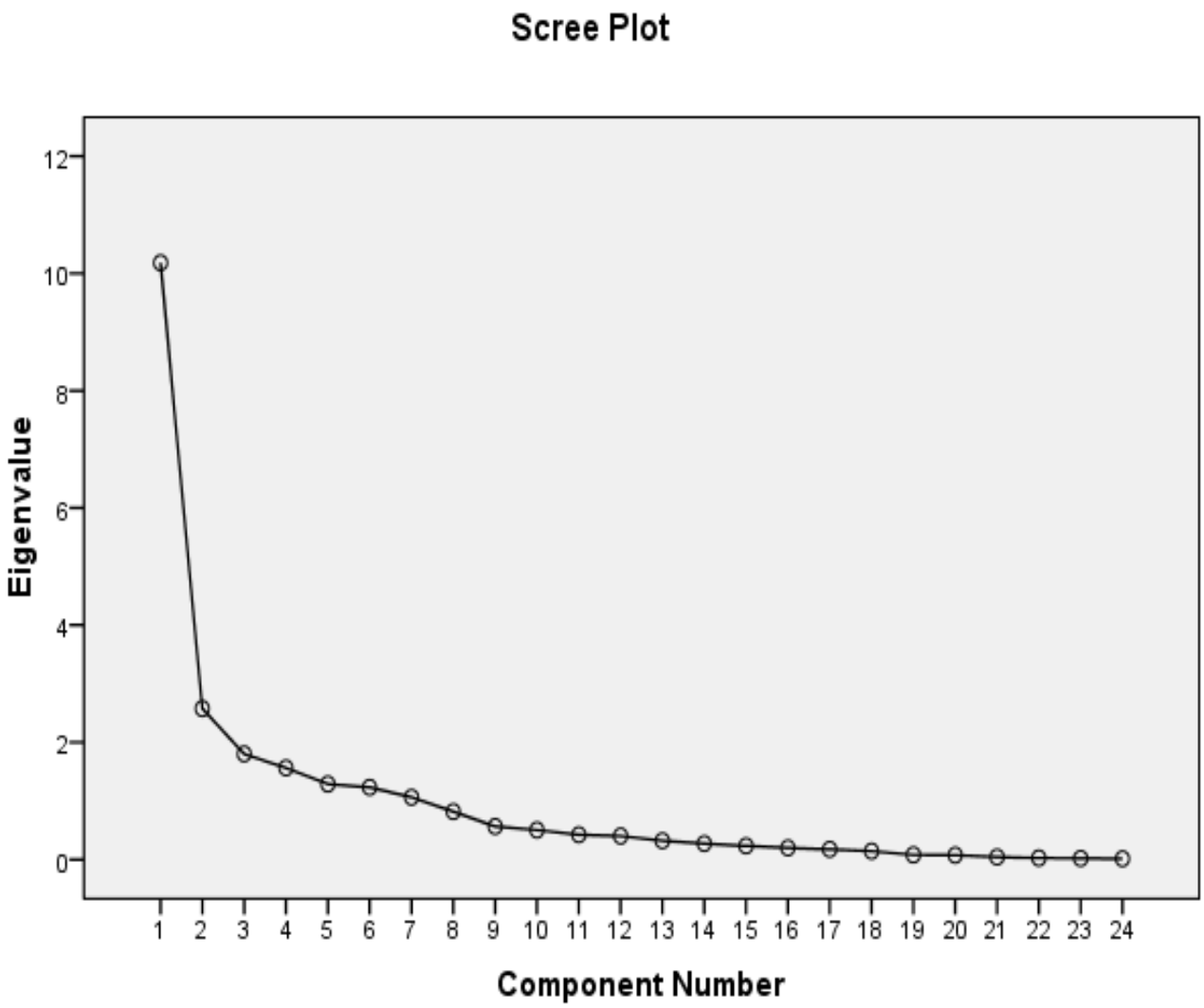
Twenty three items that were finalized through expert opinion were administered and 100 university students have responded to the request. The questionnaire was assembled on google-form and surveyed in different WhatsApp groups of students. Exploratory factor analysis (EFA) was initially applied using varimax rotation to estimate the number convergence of items under the factors as per the theory of Kelley (1992). Moreover, DeVellis (2012) suggest using theory, scree test, and parallel analysis for factorization in scale development.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.669
Bartlett's Test of Sphericity	2456.500
Df	253
Sig.	0.000

KMO and Bartlett's test was employed to assess sampling adequacy and significance level for further statistical applications. The value of KMO is estimated at .669 which is greater than the minimum value of .60 (Tabachnick & Fidell, 2013). Similarly, the value of Bartlett's test is significant ($0.000 < 0.05$) indicating that the correlation between variables are large, that allows the researcher to proceed further.

Figure 2: **Scree Plot**



The scree plot was utilized to determine the optimal number of factors to retain in the factor analysis. In our analysis scree plot displayed two factor that should be retained for further analysis.

Table 3: Parallel Analysis Test

Component	Eigenvalues	Random Eigenvalues	% of Variance	Cumulative %
1	10.178	1.258957	32.878	32.878
2	2.566	1.061662	22.528	55.406

3.2.Rotated Component Matrix of SIAA

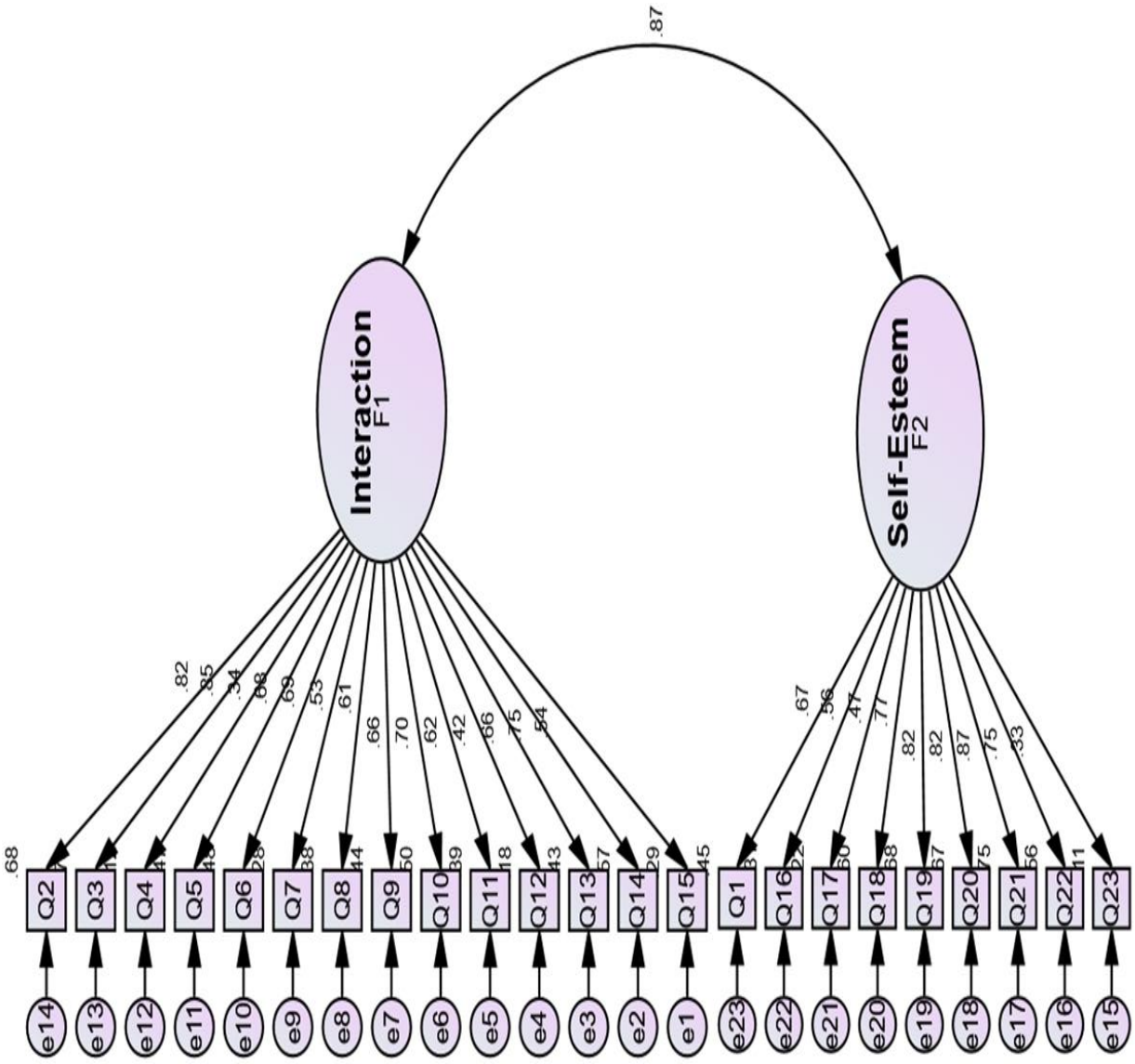
Table 4 presents Rotated Component Matrix. Varimax rotation is applied because this is the most preferably used by the scale developers in orthogonal rotation (Dimitrov, 2012). Table 4 displays the loading of each item on the identified components for the scale of SIAA. The rotated component matrix (Table 4) displays varying loadings of items across Component 1 and Component 2. Items such as TSI1, TSI2, TSI3, AM1, AM2, SS1, SS2 show higher loadings with Component 1 (.618 to .795), indicating their strong association with this component. In contrast, items TW6, TW7, SE1, SE2 exhibit higher loadings with Component 2 (.518 to .819), suggesting their stronger relationship with this distinct component in the analysis.

Table 4: Rotated Component Matrix

Item no.	Component1	component2
TSI1	**.795**	
TSI2	**.771**	
TSI3	**.768**	
TSI4	**.729**	
AM1	**.729**	
AM2	**.686**	
AM3	**.674**	
SS1	**.668**	
SS2	**.654**	
SS3	**.647**	
TW1	**.618**	
TW2	**.611**	
TW3	**.591**	
TW4	**.578**	
TW5	**.518**	
TW6		**.819**
TW7		**.791**
SE1		**.782**
SE2		**.667**
SE3		**.636**
SE4		**.615**
SE5		**.606**
SE6		**.453**

Confirmatory Factor Analysis (CFA)

Owing to the finding in the above table, the following measurement model has been constructed using AMOS-21 to confirm the internal factor structure more critically. The model presents 23 items and 2 components.



3.3.Model Fit Indicators

The CMIN/df ratio of 7.014 suggests a reasonable fit, according to Hair et al. (2010). Despite the IFI (.440) falling short of the recommended threshold of 0.90 by Hu et al. (1998), it indicates some improvement over the null model. Both PNFI (.334) and PCFI (.356) are below the typically preferred threshold of 0.50 as suggested by Mulaik et al. (1989), urging cautious interpretation. However, the NFI (.403) and CFI (.430) surpass the lower bounds suggested by Basak et al. (2013), indicating adequate fit for the model. The RMSEA (.231), though slightly above the ideal range of 0.05 to 0.08 as per Hair et al. (2010), still points towards reasonable fit with potential for refinement. Overall, while there are areas for potential improvement, the scale shows promising validity across multiple indices, supporting its reliability in measuring the intended constructs effectively.

Table 5: **Cronbach Alpha**

Sr. no	Components	No of items	Alpha	Judgement

1	Teacher student interaction	4	.808	Accepted
2	Academic motivation	3	.688	Accepted
3	Social skills	3	.722	Accepted
4	Teamwork	7	.800	Accepted
5	Self-esteem	6	.848	Accepted
	Overall SIAA	23	.930	Accepted

Table 5 displays the Cronbach's alpha coefficient for the scale, indicating a high level of internal consistency reliability. With 23 items, the alpha coefficient of .933 suggests that the items in the scale are highly correlated with each other, demonstrating strong reliability in measuring the intended constructs.

4. Discussion

This study advances educational psychology by introducing a valid and reliable instrument to assess the impact of social interaction on university students' academic achievement. The findings underscore a significant correlation between social interaction and academic success. Factor analysis confirmed the instrument's ability to measure crucial dimensions such as peer relationships, teacher-student interactions, and collaborative learning environments reliably. These dimensions were positively associated with academic outcomes, including grades, engagement, and motivation, aligning with existing research highlighting the critical role of social interactions in academic performance (Smith & Jones, 2020; Brown et al., 2019). Our study contributes by offering a validated tool applicable across diverse educational contexts.

Practically, educators can utilize this instrument to evaluate and enhance classroom social dynamics, potentially improving academic outcomes. For researchers, it offers a dependable measure to facilitate further exploration of the complex relationship between social interactions and academic achievement.

The study's sample was limited to a specific geographic region, potentially restricting the broader applicability of the findings. Additionally, the cross-sectional design used in the research does not allow for establishing causal relationships. Nevertheless, this study successfully developed and validated an instrument that effectively measures the association between social interaction and academic achievement among university students. The study aimed to explore patterns of social interaction, assess academic performance, and correlate these with university-level achievements. The research was exploratory and quantitative, focusing on examining various dimensions of this relationship. The findings are pertinent to both students and educators, providing insights into how social interaction impacts academic outcomes. The study utilized a questionnaire with closed-ended questions, capturing demographic details such as students' program, department, semester, and GPA. Data collection was conducted using Google Forms distributed through multiple channels. The development process followed established guidelines for SIAA development, including Lawshe’s content validity estimate procedure, resulting in acceptable CVI and CVR

estimates. The final scale demonstrated excellent overall reliability as indicated by Cronbach's alpha coefficient. However, all fit indices suggested that the model did not adequately fit the data, with IFI, PNFI, NFI, CFI, PCFI, and RMSEA estimates falling outside acceptable ranges. These findings imply substantial discrepancies from the expected model fit standards.

5. Conclusion and Recommendations

Based on this research, which developed and validated a scale to measure how university students interact socially, several conclusions can be drawn. The study confirmed the scale's reliability and established its validity through expert agreement and initial testing. While some measures indicated areas for improvement, like NFI, CFI, and RMSEA, the CMIN/df ratio showed a reasonable fit. The scale ended up with 23 items grouped into two factors: interaction and self-esteem. To improve the scale, it's suggested to make theoretical adjustments and test it with a larger and more diverse group of students. Long-term studies could help us understand how social interactions change over time and affect academic success. Researchers and educators should also consider how cultural differences and different school environments impact how students interact socially. These steps will help make the scale more useful for understanding and promoting positive social interactions among university students.

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