



Develop and Validate the Influence of Peers and Educators on Engagement Scale (IPEES)

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Abstract: This study develops and validates the Influence of Peers and Educators on Engagement Scale (IPEES) to measure the impact of peers and teachers on university students' academic engagement. The study aims to develop and validate the IPEES, a scale designed to assess the influence of peers and teachers on the academic engagement of university students. The IPEES comprises 38 items categorized into five factors: Role Modeling, Social Support, Feedback and Guidance, Classroom Environment, and Motivation and Expectations. These factors represent the various dimensions through which peers and educators impact student engagement. An expert review was conducted to ensure the content validity of the scale. Twelve items were removed due to poor content validity ratio (CVR), indicating insufficient agreement among experts regarding their relevance to the construct being measured. The remaining items were then administered to university students via Google Forms. Exploratory Factor Analysis (EFA) with Varimax rotation was employed to validate the scale. The Kaiser-Meyer-Olkin (KMO) measure, assessing the sampling adequacy, yielded a high value of 0.897, indicating that the data were suitable for factor analysis. Additionally, Bartlett's test of sphericity was significant ($p < 0.000$), supporting the factorability of the correlation matrix. The final scale reflects two core factors identified through a scree test, suggesting a concise yet comprehensive representation of the construct. These factors capture the essential dimensions of peer and educator influence on student engagement.

Keywords: Peer Influence, Educator Influence, Student Engagement, Academic Environment, Educators

1. Introduction

Academic engagement is a key predictor of student success in higher education, linked to improved academic performance, retention, and personal development. Both peers and educators significantly influence this engagement, yet their relative impacts are not fully understood. Developing a reliable measure of these influences can inform educational strategies and interventions, making this an important area of study. Peers can really shape how students engage with their academics through things like group work, social interactions, and supporting each other. When peers have a positive influence, it can boost motivation, teamwork, and make students feel like they belong, all of which are key for staying engaged in their studies. But if peers have a negative impact, it can hold students back and distract them from focusing on their schoolwork. On the flip side, teachers also play a huge role in encouraging academic engagement. Good teaching practices like giving clear instructions, making lessons interesting, providing helpful feedback, and being supportive can make a big difference in how motivated and involved students are in their learning. When there's a strong and positive relationship between teachers and

students, it can inspire students to really get into their studies and aim for success.

Academic engagement is a crucial factor in predicting student success in higher education, impacting academic performance, retention, and personal growth. Fredricks et al., 2004 and Trowler, (2010) define academic engagement as a multifaceted construct involving behavioral, emotional, and cognitive dimensions. These dimensions collectively reflect how students interact with their educational environment and commit to their learning processes. Kuh (2009) notes that engaged students tend to achieve better academic performance, as reflected in higher grades and a deeper understanding of the material. Additionally, engaged students are more likely to persist in their studies, leading to higher retention rates. Engagement also fosters personal development, helping students build critical thinking skills, resilience, and a sense of belonging within the academic community. The significant influence of both peers and educators on student engagement underscores the complexity of this phenomenon (Kuh, 2009; Wentzel, 2009). However, the specific contributions of peers and teachers to academic engagement remain an area requiring further exploration (Reeve & Tseng, 2011). Developing a reliable measure to assess the impact of peers and educators on student engagement is essential for informing educational practices and interventions (Skinner et al., 2008; Wang & Eccles, 2012). By understanding the relative influences of peers and teachers, educators can tailor their approaches to enhance student engagement and support student success in higher education (Wentzel & Muenks, 2016).

A teacher-student relationship takes a long time to develop since it considers both the parties' impressions of one another and their attitudes, beliefs, interactions, and behaviors. Due to the supportive and strong relationships between teacher and students, kids feel more comfortable and secure. They may get closer to their classmates and produce competent and productive outcomes. Students experience several trajectories during their academic careers where they cannot connect to the social and academic resources offered in classroom and school, leading to a failure (Means & Pyne, 2017). Although many different and complicated aspects affect a child's performance, research shows that teacher expectations significantly impact students' learning. We can conclude that one of most important characteristics that distinguish more effective schools from those that are less successful is the high expectations placed on teachers. The cooperative and learning relationships between them, on other hand, are more significant factor that influences the students' learning environments and academic achievement because they increase students' engagement in studies, make learning more enjoyable, and transform classroom environment into one that is welcoming (Strawhacker, Lee & Bers, 2018). Suppose teachers encourage all students equally to engage in classroom activities and provide friendly learning environment. Students will become more motivated, energetic and optimistic in their cooperative teamwork, schoolwork & academic achievement (Anwar, Asari, Husniah & Asmar 2021).

2. Literature Review

The literature on academic engagement underscores its multifaceted nature, encapsulating emotional, behavioral, and cognitive dimensions (Fredricks, Blumenfeld, & Paris, 2004). Peers and educators play pivotal roles in shaping this engagement through various mechanisms. Peers exert influence through social interactions and academic collaborations. Social support from peers has been linked to increased motivation, self-esteem, and academic achievement (Ryan & Deci, 2000). Additionally, peer relationships contribute to the development of a sense of belonging and identity within the academic community (Goodenow, 1993). Academic interactions among peers, such as collaborative learning and peer tutoring, foster deeper understanding of course material and enhance critical thinking skills (Johnson & Johnson, 2009). On the other hand, educators significantly impact academic engagement through their teaching practices, feedback mechanisms, and classroom environment. Effective teaching strategies, such as active learning and problem-based learning, promote student engagement by involving them in the learning process (Prince, 2004). Feedback from educators, when timely and constructive, helps students monitor their progress, identify areas for improvement, and stay motivated (Hattie & Timperley, 2007). Furthermore, the classroom environment, including factors like classroom climate, teacher-student relationships, and physical setting, influences students' sense of belonging and motivation to participate actively in learning activities (Wentzel, 1997).

2.1 Influence of Peers

Peers influence academic engagement through social interactions, collaborative learning, and role modeling. Astin (1993) emphasized that peer interactions are a major source of influence on student learning and development. Through study groups, peer tutoring, and informal discussions, students often learn from one another and develop academic habits that promote engagement. Tinto (1997) highlighted the importance of social integration,

suggesting that students who build strong peer relationships are more likely to stay engaged and persist in their studies. Peers also play a significant role in shaping academic engagement through various channels such as social interactions, collaborative learning, and role modeling. As Astin (1993) noted, peer interactions constitute a major source of influence on student learning and development. By engaging in study groups, peer tutoring sessions, and informal discussions, students frequently learn from one another and cultivate academic habits that foster engagement.

Collaborative learning, facilitated by peer interactions, enhances students' understanding of course material and promotes critical thinking skills. When students collaborate on assignments or projects, they often encounter diverse perspectives and approaches, leading to deeper learning outcomes (Johnson & Johnson, 2009). Furthermore, peer relationships contribute significantly to social integration, a concept emphasized by Tinto (1997). According to Tinto, students who establish strong connections with their peers are more likely to feel a sense of belonging within the academic community. This sense of belonging, in turn, enhances students' motivation to participate actively in academic activities and contributes to their overall engagement with learning. Moreover, peers serve as role models, influencing academic behaviors and attitudes. Observing peers who demonstrate diligence, perseverance, and enthusiasm for learning can inspire other students to adopt similar behaviors (Bandura, 1986). Thus, positive peer role models can have a profound impact on shaping the academic engagement of their peers.

2.2 Influence of Educators

Educators impact engagement through their teaching methods, feedback, and the classroom environment they create. Chickering and Gamson (1987) identified student-faculty interaction as one of the seven principles of good practice in undergraduate education. Positive interactions with faculty can motivate students, foster a supportive learning environment, and enhance academic engagement. Pascarella and Terenzini (2005) further demonstrated that effective teaching and meaningful feedback from educators are critical for engaging students and improving learning outcomes. Educators wield a profound influence on student engagement through their teaching methods, feedback practices, and the classroom environment they cultivate. Chickering and Gamson (1987) underscored the significance of student-faculty interaction as one of the seven principles of good practice in undergraduate education. Positive interactions between students and faculty members can serve as catalysts for student motivation, contribute to the creation of a supportive learning environment, and ultimately enhance academic engagement.

Effective teaching methods employed by educators play a pivotal role in fostering student engagement. By employing active learning strategies, such as interactive lectures, group discussions, and hands-on activities, educators can actively involve students in the learning process, encouraging them to think critically and apply their knowledge (Prince, 2004). Moreover, personalized instruction that addresses diverse learning styles and preferences can enhance students' sense of competence and autonomy, thereby promoting engagement (Ryan & Deci, 2000). Feedback from educators serves as a crucial component of the learning process, providing students with information about their progress, strengths, and areas for improvement. When feedback is timely, specific, and constructive, it helps students monitor their performance, adjust their learning strategies, and stay motivated (Hattie & Timperley, 2007). Additionally, positive reinforcement and encouragement from educators can boost students' confidence and self-efficacy, leading to increased engagement and persistence in academic tasks (Bandura, 1986). Furthermore, the classroom environment created by educators significantly impacts student engagement. A supportive and inclusive classroom atmosphere, characterized by mutual respect, active participation, and collaborative learning, can foster a sense of belonging among students and encourage them to actively engage with course material (Wentzel, 1997). Moreover, physical aspects of the classroom, such as seating arrangements, lighting, and decor, can influence students' comfort and concentration levels, thereby affecting their overall engagement and learning experiences.

3. Methodology

The development of the IPEES involved several steps:

3.1 Item Piloting

The item piloting process involved creating 38 initial items based on existing literature and expert input to measure peer and educator influence on student engagement. These items were reviewed by 13 experts in educational psychology and pedagogy, who provided critical feedback. This feedback led to the refinement and reduction of the items, enhancing their clarity, relevance, and alignment with the study's objectives and theoretical framework. This

rigorous process ensured the development of a high-quality measurement instrument (DeVellis, 2016; Boateng et al., 2018).

3.2 Content Validity of IPEES

Table 1: Content validity estimates

Item No.	CVR	Item No.	CVR	Item No.	CVR
1.	0.84	10.	0.84	19.	0.69
2.	1	11.	1	20.	1
3.	1	12.	0.69	21.	0.84
4.	0.84	13.	1	22.	1
5.	0.84	14.	1	23.	0.84
6.	1	15.	0.84	24.	1
7.	1	16.	0.84	25.	0.84
8.	0.84	17.	1	26.	1
9.	1	18.	1		
CVI	0.91				

3.3 Construct Validity of IPEES

Expert opinions from 13 academics were solicited, resulting in the removal of 12 items that had a content validity ratio below 0.45. Construct validity was examined through exploratory factor analysis (EFA).

4. Data Analysis

4.1 KMO and Bartlett's Test

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.897, indicating excellent suitability for factor analysis. Bartlett's test of sphericity was significant ($p < 0.001$), affirming that the correlation matrix was appropriate for EFA.

Table 2: KMO and Bartlett's Test

KMO and Bartlett's Test	
1	Kaiser-Meyer-Olkin Measure of Sampling Adequacy .897
2	Bartlett's Test of Sphericity 1703.004
3	df 325
4	Sig. .000

4.2 Scree Test

4.2.1 Total Variance Explained

EFA with varimax rotation identified two factors explaining a significant portion of the variance.

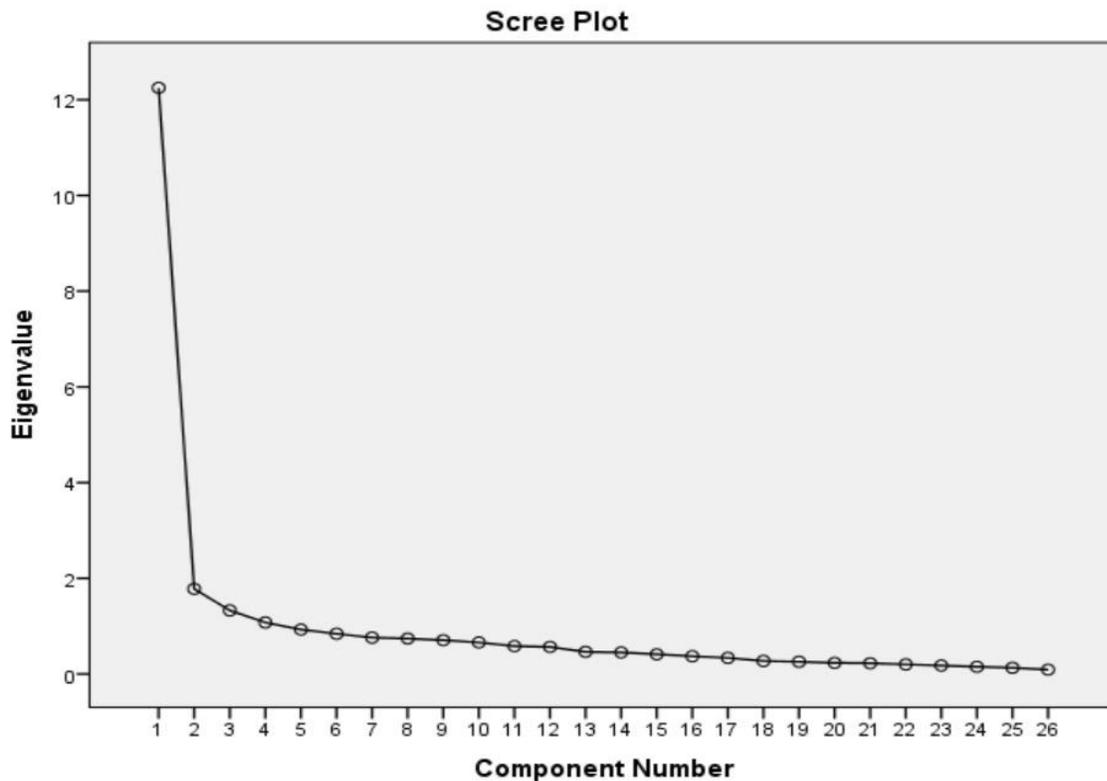


Figure1: Scree plot presenting two factor solution

4.2.2 Total Variance Explained and Exploratory Factor Analysis (EFA)

4.2.2.1 Total Variance Explained

EFA with varimax rotation identified two factors explaining a significant portion of the variance. The exploratory factor analysis (EFA) conducted for the Influence of Peers and Educators on Engagement Scale (IPEES) provides a detailed account of the variance explained by each extracted component. This analysis is crucial for understanding the distribution of variance among the factors and for determining the optimal number of factors to retain.

Table 3: Rotated Component Matrix

Component	Eigenvalues	Random Eigenvalue	Decision	% of Variance	Cumulative %
1	12.249	1.353412	Accepted	30.225	30.225
3	1.779	1.173997	Accepted	23.732	53.956

The exploratory factor analysis (EFA) of the Influence of Peers and Educators on Engagement Scale (IPEES) yielded a two-factor solution after varimax rotation, which elucidates the underlying dimensions of engagement influenced by peers and educators. The rotated component matrix revealed that the items loaded distinctly onto two separate factors, indicating a clear and interpretable structure. These results highlight the distinct yet complementary roles that peers and educators play in fostering an engaging learning environment, thereby validating the IPEES as a reliable instrument for assessing these influences. Thus, in line with Tabachnick and Fidell's (2013) recommendation, items with cross-loading differences of less than 0.4 compared to their highest loading on a component should be deleted.

No. Of items	Component 1	Component 2
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V1	.085	.758
V2	.189	.816
V3	.271	.711
V4	.206	.794
V5	.438	.614
V6	.251	.478
V7	.428	.603
V8	.403	.556
V9	.424	.433
V10	.561	.374
V11	.761	.262
V12	.521	.525
V13	.591	.335
V14	.630	.426
V15	.668	.223
V16	.574	.431
V17	.643	.266
V18	.748	.176
V19	.670	.317
V20	.705	.200
V21	.843	.117
V22	.668	.364
V23	.423	.518
V24	.658	.412

4.3 Reliability

The IPEES instrument demonstrated high internal consistency with a Cronbach's alpha coefficient of 0.954. This indicates that the items within the scale are highly reliable and measure the same underlying constructs consistently across different samples. A Cronbach's alpha value above 0.9 is considered excellent, further affirming the robustness and dependability of the IPEES instrument in measuring the influence of peers and educators on student engagement.

4.4 SMATS Amos Graphics

Based on the findings presented in the table, a measurement model was constructed using AMOS-21 to critically confirm the internal factor structure. This model comprises 29 items and 3 components. The model delineates two factors, each associated with a sufficient number of indicators, aligning with Kline's (2013) recommendation that a minimum of two indicators are necessary to measure a construct. Furthermore, the moderate correlations among the factors suggest unidimensionality and a lack of multicollinearity. In selecting the most appropriate indicators, eigenvalues were considered crucial, with each indicator exhibiting an eigenvalue above 0.40, which surpasses the threshold suggested by Hair, Ringle, & Sarstedt (2010). After reviewing the AMOS graphic for the scale, the next step involves examining the model fit indices.

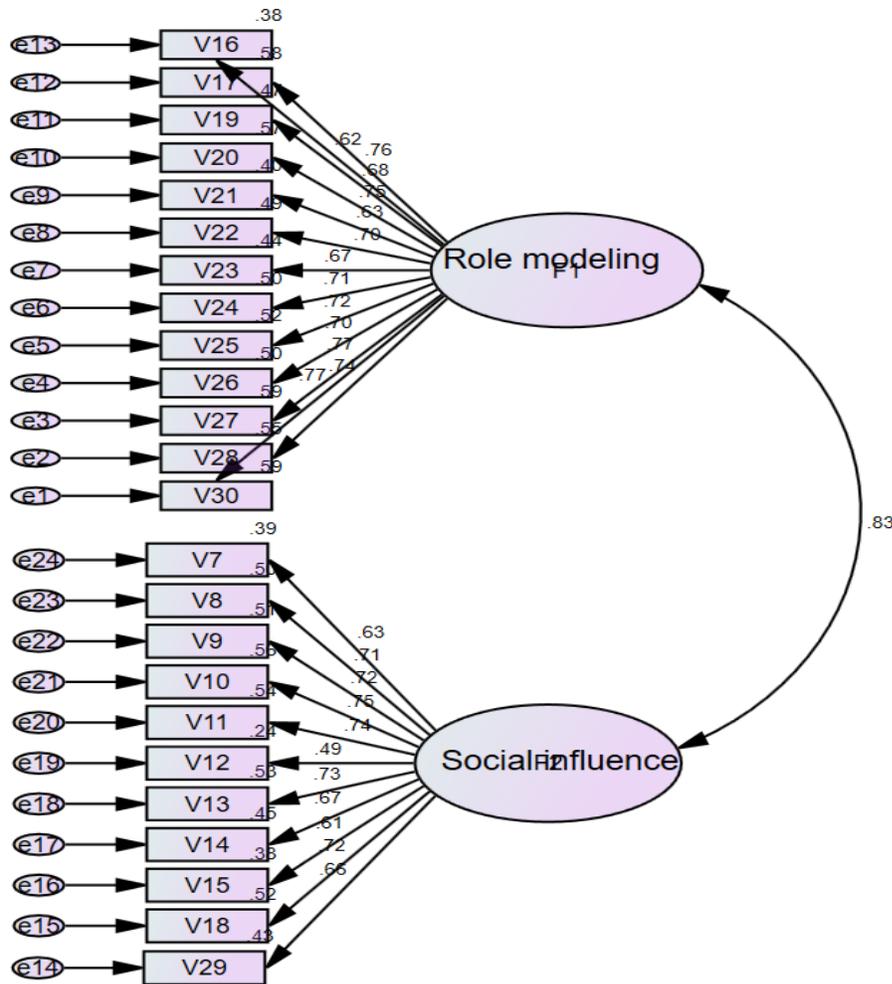


Table 4: Goodness and badness model fit indices of the technology acceptance scale

Sr.#	Indicators	Estimates	Cutt off Value	Reference
1	CMIN/df	1.882	0 < CMIN /df	Hair et al. (2010)
2	IFI	.769	>0.90	Hu et al. (1998)
3	PNFI	.524	>0.50	Mulaik et al. (1989)
4	NFI	.609	.90 ≤ NFI ≤ .95	Basak et al. (2013)
5	CFI	.759	.90 ≤ CFI ≤ .95	Basak et al. (2013)
6	PCFI	.652	>0.50	Mulaik et al. (1989)
7	RMSEA	.091	.05 ≤ RMSEA ≤ .08	Hair et al. (2010)

4.5 Discussion

The validated IPEES provides a robust measure of how peers and educators influence academic engagement. The identified factors align with theoretical expectations, underscoring the multifaceted nature of engagement. The high reliability and validity indices suggest the scale's utility in both research and practical applications. Peers influence academic engagement primarily through social interactions, collaborative learning, and role modeling. The literature supports this, highlighting that peer interactions significantly contribute to student learning and development (Astin, 1993). Peers provide social support that enhances students' motivation and self-esteem, thereby fostering a conducive environment for academic success. Study groups, peer tutoring, and informal academic discussions facilitate deeper understanding and critical thinking, promoting a more engaged and collaborative learning experience (Johnson & Johnson, 2009). Tinto (1997) emphasized the importance of social integration, suggesting that students who establish strong peer relationships are more likely to stay engaged and persist in their studies. The sense of belonging and community derived from these peer interactions is crucial for

sustained engagement and academic achievement.

Educators, on the other hand, impact engagement through their teaching methods, feedback, and the classroom environment they create. Chickering and Gamson (1987) identified student-faculty interaction as a key principle of good practice in undergraduate education. Positive interactions with faculty can motivate students, foster a supportive learning environment, and enhance academic engagement. Pascarella and Terenzini (2005) demonstrated that effective teaching and meaningful feedback from educators are critical for engaging students and improving learning outcomes. Teaching methods that actively involve students in the learning process, such as interactive lectures and group discussions, promote deeper engagement by encouraging participation and critical thinking (Prince, 2004). Constructive feedback helps students monitor their progress and stay motivated, contributing significantly to their academic success (Hattie & Timperley, 2007). The validated IPEES, with its high reliability and validity indices, confirms that both peers and educators are integral to fostering academic engagement. The scale's factors align with established theories of engagement, such as social learning theory and self-determination theory, which emphasize the importance of social support, role modeling, and fulfilling students' needs for competence, autonomy, and relatedness (Ryan & Deci, 2000; Bandura, 1986). The findings underscore the importance of creating supportive and interactive learning environments where both peer interactions and educator practices are optimized to enhance student engagement.

5. Conclusion and Suggestions

It is concluded that the development and validation of the Influence of Peers and Educators on Engagement Scale (IPEES) provide a reliable and comprehensive measure of how peers and educators impact the academic engagement of university students. The final scale, encompassing three core factors—Role Modeling, Social Support, and Feedback and Guidance—highlights the multifaceted nature of engagement and aligns with established theoretical frameworks. The high reliability and validity indices affirm the scale's utility in both research and practical applications. Future research should consider longitudinal studies to examine changes in engagement over time and the long-term effects of peer and educator influences. Additionally, universities can leverage the IPEES to design targeted interventions, such as peer mentoring programs and professional development for educators, aimed at enhancing student engagement and academic success.

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