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Research Article

From Social Networks to Real Life: The Impact of Schoolboys' Education on Respectful Behavior Towards Schoolgirls in the 4.0 era

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Abstract

This study investigated the impact of schoolboys' education on fostering respectful behavior toward schoolgirls in the 4.0 era, characterized by pervasive digital technology and social networks. The research addressed a critical gap by focusing on boys' education as a means to promote gender respect and equality. Methodologically, the authors used a quantitative research approach, then developed an online survey using Google forms and a 5-level Likert scale to collect primary data from 260 respondents at local high schools, colleges, and Asian institutions where international students from various Asian regions study. The linear regression results revealed awareness and knowledge building play the most influential role in shaping schoolboys' education, with a strong impact score of .827. Skill development and practice also had a notable effect, scoring .69 in this digital age. Additionally, peer group norms acted as a key moderating factor (.55), enhancing the influence of awareness and knowledge building on schoolboys' education. The uniqueness of the study lay in its focus on the role of educating schoolboys to promote respect toward schoolgirls, particularly in the 4.0 era, where social media and digital technologies strongly shape perceptions and behaviors. This research specifically examined the impact of awareness-building, skill development, and the moderating role of peer group norms. Additionally, it integrated Social Learning Theory and the Theory of Planned Behavior, offering a novel framework to bridge the gap between online and real-world behaviors.

Keywords: Schoolboys' education; gender respectful behavior; awareness & knowledge building; skill development & practice; moderating role of peer group norms; social media impact.

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The widespread use of social media has fundamentally transformed the patterns of social interactions, deeply influencing how students perceive themselves and others within the complex and diverse fabric of society (Purnama & Asdlori, 2023). Amid these changes, education plays a pivotal role in shaping schoolboys' attitudes and behaviors toward schoolgirls, fostering respect both in virtual spaces and real-life interactions in the 4.0 era. This understanding helped shape policies and practices that support both genders and foster respect within academic spaces (Gul and Samina, 2023). Addressing this topic is critical, as gender respect forms the foundation of equitable relationships and societal harmony. Therefore, recognizing the increasing concerns over gender-based disrespect and inequality, this paper focused on the impact of targeted education programs for schoolboys in promoting respectful behavior toward schoolgirls-an essential foundation for equitable relationships and societal progress.

Although there has been a lot of research on gender education and gender equality (Chisamya et al., 2012), much of the current work still focuses on raising awareness for schoolgirls or general frameworks on gender equality. However, specific studies on the role of boys' education in shaping respect for girls are still quite limited. Social media has significantly altered the way young people spend their time, exchange information, and communicate with others, raising growing concerns about its possible harmful effects (Orben, 2022). Previous research has predominantly concentrated on understanding and implementing ambidextrous strategies within organizations (Kar et al., 2021), failing to capture the profound influence of the 4.0 era - where digital technology and social networks significantly affect students' perceptions and behaviors. Additionally, the absence of clear definitions, along with the wide range of approaches and frameworks, created challenges for both practitioners and researchers in higher education (Gallagher and Savage, 2020). Recognizing these limitations, this study aimed to bridge the gap by focusing on the role of

boys' education in fostering respectful behavior toward girls, while addressing the unique challenges and opportunities presented by the 4.0 era.

This article sought to fill these gaps by exploring one main research question with the answer: "Does the education of schoolboys influence their behavior toward schoolgirls in the 4.0 era?". Along with that, the authors also suggested two research sub-questions: "How positively do awareness & knowledge building and skill development & practice impact respectful behavior towards schoolgirls in the 4.0 era?". Then, the second research sub-question needed to be addressed: "How positively does peer group norms moderate the relationship between awareness & knowledge building for schoolboys and respectful behavior in the 4.0 era?". Accordingly, the objectives of this study were threefold: First, it aimed to examine whether educating schoolboys has a significant impact on fostering respectful behavior toward schoolgirls, particularly in the transition from interactions on social networks to real-life settings. The paper sought to clarify the conceptual framework of two key educational mechanisms-building awareness & knowledge and developing skills & practice-and analyze how these mechanisms influence schoolboys' respectful behavior; Moving on the second objective, the authors identified the moderating role of peer group norms on forming attitudes of gender equality; And thirdly, this paper aimed to contribute practical insights to enhance current educational environments by proposing actionable strategies that promote respect and equity among students.

The brain has never operated as a uniform or universal system for everyone; instead, its cells, circuits, and regions have been fine-tuned to enable the specific behaviors unique to each species (Miller et al., 2022). It encompasses a wide range of activities, including verbal and non-verbal expressions, habits, and social interactions. A respectful attitude involved showing kindness, politeness, and avoiding causing harm to others (Kitsiou et al., 2020 cited in Utomo et al., 2023). Respectful behavior involves treating individuals as equals, fostering a positive environment, and adhering to social norms that promote mutual understanding and harmony (Leape et al., 2012).

The issue of respectful behavior among schoolboys toward schoolgirls has become increasingly complex in the digital age. With the rise of social networks, the rise of Internet-based social networking tools has drastically transformed how people interact in the modern world (Gupta et al., 2018). Social media platforms often amplify gender dynamics, where schoolboys' behaviors towards schoolgirls may be influenced by online trends, peer pressure, or anonymity afforded by digital spaces. Beyond the virtual environment, the issue of respectful behavior extends into real-life settings, such as classrooms, campuses, and

broader social interactions. On school campuses and in society, an important function of schools is that they act as a setting for reinforcing heteronormative practices and stereotypical gender roles (Rosen & Nofziger, 2018). Schoolboys may exhibit patterns of interaction that either reinforce respect or perpetuate harmful stereotypes and behaviors. This underscores the necessity for structured education to bridge the gap between awareness and practice, ensuring respectful behavior is consistent both online and offline.

Social Learning Theory

Social Learning Theory (Bandura, 1986), often referred to as observational learning, takes place when an individual's behavior is influenced and altered after observing the actions of a role model (Edinyang, 2016). In the context of educating boy students, this theory highlighted how role models-such as teachers, parents, peers, and influential figures-play a critical role in shaping respectful behavior toward girl students. A widely used method for this goal was to present students with STEM role models, whom we defined as individuals capable of positively influencing a student's motivation by serving as successful examples (Gladstone & Cimpian, 2021). In the digital era (Industry 4.0), learning could also be provided through the teaching factory, a hands-on integration experience that bridges the gap between university and industry, originating from instructional methods utilized in the healthcare sector (Belinski et al., 2020). Educational interventions can leverage tools like interactive videos, gamified learning, and AI-driven simulations to showcase respectful behaviors.

Theory of Planned Behavior

In the context of the 4.0 era, the education of schoolboys plays a key role in fostering respectful behavior towards schoolgirls. According to Ajzen (1991), the Theory of Planned Behavior focused on the relationship between attitudes, subjective norms, and perceived behavioral control influence and predicted intentions. With moral concerns surrounding violence, it was advisable to include perceived moral norms in this context (Fishbein & Ajzen, 2010), so bystanders connected the potential outcome to their peer group's standards and align their actions with shared expectations regarding their role in the situation (Brehmer, 2023). Advancements in artificial intelligence, augmented reality, and adaptive learning algorithms were driving the creation of smart tutoring systems and customized learning experiences that are designed to meet the unique preferences and abilities of each learner (Nowell et al., 2020). These tools allow schoolboys to observe and practice gender-respectful behaviors, both online and offline. Combining education with technological support encourages positive behavioral change, helping boys adopt respectful attitudes towards schoolgirls and fostering a culture of respect.

The Impact of Schoolboys Education

Awareness and knowledge building

Awareness referred to the mental process of gaining knowledge and understanding through thinking, experiences, and sensory input (Mak, 2015). It encompasses various functions such as attention, memory, reasoning, problem-solving, and decision-making. In addition, knowledge construction has been the active process of acquiring and developing new knowledge and understanding (van Aalst, 2009 cited in Disch et al., 2023). In the framework of knowledge construction, constructivism posited that learners expand on their existing cognitive frameworks by incorporating new information, which requires actively interacting with new content, linking it to prior knowledge, and adjusting one's understanding to integrate new perspectives (McLeod, 2024). Michael Kimmel, a sociologist specializing in feminism and gender studies, advocated for adults to engage in the lives of these young men, fostering discussions that will enable them to reflect critically on their thoughts, behaviors, and actions, in order to better understand what it truly means to become a man in today's society (Hoffman, 2010).

Sociologists who adhere to constructivism emphasize the important role of knowledge and awareness building in shaping students' behavior and values, including how boy students interact with girl students (Abdikadyr et al., 2025). As stated by Piaget (1970), students build knowledge not only by receiving information but also through social interactions and dialogue, which can help them develop a deeper understanding of values such as respect and fairness. Vygotsky (1978) also added that cognition is shaped within a social and cultural context, where interactions between boy and girl students can foster a better understanding of gender equality and the role of respect in social relationships. Bruner (1960) also suggested that education should create environments that encourage social interaction, where students can exchange ideas, critique, and co-construct new understandings. This process not only helps schoolboys become aware of their behavior but also provides opportunities for them to reconsider and shift their views on girl students. Through collaborative knowledge-building, students can learn not only academic content but also develop social and moral values, including respect for schoolgirls. This can contribute to a more positive and equitable learning environment, where respect and equality thrive. Some researchers argue that increased awareness and knowledge dissemination through social media can significantly enhance respectful behavior towards girl students. A study by Agarwal et al. (2024) found that social media platforms effectively raised boy students' awareness and engagement with social issues, including gender equality, leading to more

respectful interactions. The results of the study on digital networks indicate that students are significantly influenced by social media to drive societal change and are actively involved in this process. This suggested that new digital platforms play a crucial role in fostering youth activism (Agarwal et al., 2024). Conversely, other studies suggest that merely increasing awareness and knowledge may not substantially influence behavior. The European Parliament's 2023 report highlighted that, despite awareness campaigns, social media continues to perpetuate sexism and gender stereotypes, indicating a limited effect on changing behaviors towards women and girls. The study covered issues such as sexism and gender stereotypes in online advertising, pro-anorexia content, gender-based and sexual harassment, image-based abuse (e.g., unsolicited nudes and sextortion), technological coercive control, misogyny in gaming, hate campaigns against women professionals, algorithmic bias, and the rise of boy supremacism and pornography (European Parliament, 2023). Besides, a more nuanced view is presented by Adegboyega (2020), who suggested that the influence of social media on students' social behavior is complex. While it can promote positive interactions, the impact varies based on factors such as gender, age, and educational level, indicating a moderate effect on fostering respectful behavior towards girl students. Social media undeniably contributes to societal progress and individual development by providing access to valuable information. Also, numerous lectures and educational content are delivered through these platforms. Nonetheless, he might contend that children may be exposed to and influenced by the negative aspects of social media without proper supervision.

Workshops, lectures, and case studies have proven to be effective methods for building awareness and knowledge about gender equality among boy students. These interactive sessions, often incorporating role-playing and scenario-based discussions, aim to enhance students' understanding of respect in relationships and daily interactions. Such programs addressed common misconceptions about gender roles and emphasize the importance of treating everyone with dignity (Condron et al., 2022). For example, the "Mentors in Violence Prevention" (MVP) program utilizes peer-education models to promote these values. Research indicates that these workshops can significantly impact boy students' awareness and knowledge regarding gender respect. A study of Setty (2022) conducted in Southeast England explored how boys are taught about consent, highlighting the importance of educational initiatives in shaping their understanding of gender dynamics. Additionally, a study of Savarese et al. (2024) examined gender representations, empathy, and gender-based violence found that higher scores in gender sensitivity among schoolboys could

indicate a heightened awareness of gender issues, possibly due to specific training or workshops.

The ASEAN region has been integrating Comprehensive Sexuality Education (CSE) into school curricula to promote healthy and respectful relationships among young people (UNESCO, 2018c). CSE programs covered topics such as consent, gender equality, and interpersonal skills, providing students with the knowledge and tools to make responsible choices (UNESCO, 2018c). These educational efforts have been particularly impactful in shaping the attitudes and behaviors of boy students, encouraging them to engage in respectful interactions and relationships (UNESCO, 2018c). Another example is the "GEMS" (Gender Equity Movement in Schools) project, which is essential for ensuring the right to education for everyone. As outlined in the Incheon Declaration and Framework for Action, UNESCO Member States, including those in Southeast Asia, were dedicated to promoting gender-sensitive policies, creating inclusive learning environments, integrating gender issues into teacher training and curricula, and eradicating gender-based discrimination and violence in schools (UNESCO, 2016). This project utilized extracurricular activities, role-playing, and games to engage students in discussions about gender equality and respectful behavior. The GEMS project has shown positive outcomes in promoting supportive attitudes toward gender equality among adolescents (Achyut et al., 2011). An evaluation study using a quasi-experimental design assessed the pilot program's impact on students, finding that participants became more supportive of girls pursuing higher education and marrying later, as well as boys and men contributing to household tasks (Achyut et al., 2011). Thus, we hypothesize that:

H1: Awareness and knowledge building puts a positive impact on schoolboys' respectful behavior towards schoolgirls in the 4.0 era.

Skill development and practice

Skill development referred to the process of enhancing and expanding an individual's abilities through learning, training, and experience, enabling individuals to improve job performance and adapt to changes in the work environment (Hong et al., 2024). According to the World Bank (2024), effective skill development could reduce unemployment and underemployment, increase productivity, and improve living standards. Meanwhile, skill practice involved applying learned abilities in real-world scenarios through repetition and experience, reinforcing knowledge, boosting confidence, and enhancing the execution of tasks related to specific skills (Hair, 2010). When we combined skill development and practice is crucial in education and training, as it allows individuals to apply theoretical knowledge in practical

settings, leading to comprehensive skill acquisition (Williams & Hodges, 2023). Skill development and practice are essential in promoting respectful behavior of boy students towards girl students. When we have given them the tools to show respect-like practicing through role-playing, learning how to resolve conflicts, and sharpening their communication skills, they are more likely to develop positive habits, such as listening attentively and embracing inclusivity (UNESCO, 2023).

To understand how skill development and practice influence respectful behavior, it is important to examine the perspectives of key sociological and philosophical theories that highlight the role of social contexts, ethical wisdom, and experiential learning in shaping behavior. Cultural Capital - Pierre Bourdieu suggested that skill development and practice are influenced by social and cultural contexts, particularly the resources and opportunities available within one's environment (Huang, 2019). In the case of male students, their interactions with female students could be shaped by the cultural capital they possess, including the values and behaviors they learn from their families, communities, and educational systems (Huang, 2019). If these environments promote gender equality and respectful behavior, schoolboys are more likely to develop respectful attitudes toward schoolgirls through practice and social learning. Aristotle's concept of "phronesis" (practical wisdom) further supports this idea, emphasizing that developing respect and ethical behavior required not just theoretical knowledge but also practical experience (Darnell et al., 2022). For Aristotle, boy students could develop the wisdom to treat girl students with respect by applying moral principles in their daily interactions, refining these behaviors through practice (Darnell et al., 2022). Similarly, John Dewey's Theory of Experiential Learning suggested that skill development occurs through active engagement with the world, where individuals refine their abilities through real-world experiences (Morris, 2019). When schoolboys are given opportunities to practice respectful behavior in real-life scenarios-such as group discussions, collaborative activities, or conflict resolution exercises-they are more likely to internalize these behaviors, fostering a culture of respect and understanding. These theories highlight that skill development and practice are crucial in shaping the respectful behaviors of boy students towards girl students, with social context, moral wisdom, and hands-on experiences playing key roles in this process.

The impact of skill development and practice on boy students' respectful behavior towards girl students in social media is a topic of ongoing debate. Some scholars argue that skill development and practice have a significant influence in these environments. For instance, research on social skills development among students showed that fostering respectful interactions through skill-building can lead to better communication and more positive gender

relations, especially in educational settings (Rashid et al., 2020). However, other perspectives highlight that the impact of these skills in social media is limited. While social media offers a platform for interaction, it also posed challenges, such as reinforcing gender stereotypes and biases, which can undermine respectful behavior (Llorens et al., 2021). A study on gender bias in academia, for example, noted how stereotypes can persist in online spaces, influencing boy students' behavior towards girl students (Llorens et al., 2021). From a philosophical standpoint, Aristotle's concept of "phronesis" (practical wisdom) stressed the importance of applying ethical principles through practice, which in the case of social media, means translating respectful attitudes into real online interactions (Darnell et al., 2022). Sociologically, the idea of "social capital" emphasizes how networks and relationships within a community influence behavior. In the context of social media, the development of positive social capital could foster mutual respect, as seen in studies on gender norms and social behaviors in digital spaces (Cislaghi & Heise, 2020).

Role-modeling and mentorship programs play a crucial role in shaping boy students' respectful behavior towards schoolgirls. Observing respectful behavior modelled by teachers, coaches, and mentors provides schoolboys with concrete examples of empathy, equity, and accountability. Research indicated that positive role models and mentors can encourage identity acceptance and enhance psychological well-being among students, fostering a more respectful and inclusive environment (Cottle et al., 2024). Programs that pair schoolboys with positive boy role models reinforce these concepts by offering guidance and support. Such mentorship relationships have been shown to positively influence students' academic and social outcomes, promoting respectful interactions and behaviors (Atif et al., 2022). Engaging in discussions about historical and current gender-based inequalities helped students critically analyze societal norms and develop a deeper understanding of respect and equality (Kuchynka et al., 2022). Initiatives like the HeForShe campaign exemplify this approach by involving boy leaders in advocating for gender equality, thereby encouraging boy students to reflect on and challenge existing gender norms. The HeForShe Alliance (2023) highlighted the importance of boy allies in disrupting patriarchal structures and transforming social norms that perpetuate gender bias.

Skill development and practice have been shown to positively influence student behavior in high schools within Southeast Asia. In Cambodia, a school-based intervention aimed at promoting life skills among students led to enhanced mental health and a reduction in high-risk behaviors, particularly among boy students (Jegannathan et al., 2014). This suggested that life skills training can foster more respectful and positive interactions among students.

Similarly, in Thailand, social skills interventions for adolescents with autism spectrum disorder have been tailored to meet the specific needs and preferences of students, caregivers, and healthcare professionals. These interventions aimed to improve social interactions and behaviors, highlighting the importance of context-specific skill development programs in enhancing student conduct (Nadlada et al., 2024). Therefore, the second hypothesis is formulated as follows:

H2: Skill development and practice positively impact schoolboys' respectful behavior towards schoolgirls in the 4.0 era.

Peer group norms

Peer group norms refer to the shared rules, beliefs, or behaviors established and maintained within a specific peer group. These norms acted as a catalyst in shaping individuals' attitudes, perceptions, and behaviors, particularly during adolescence and early adulthood, when peer influence was most significant (Brown, 1990). Thanks to peer group norms, fostering awareness and knowledge building can more strongly influence respectful behaviors, especially among boy students toward girl students. Depending on their nature, they could encourage positive outcomes, such as promoting gender respect and equitable interactions, or moderated undesirable attitudes, such as biases or disrespect (Simons & Farhat, 2010). From a sociocultural perspective, Vygotsky (1978) emphasized that learning is a socially mediated process where peer group norms actively contribute to co-constructing knowledge and raising awareness about essential social values, including gender equality and mutual respect. Similarly, Bandura's (1986) social cognitive theory highlighted how individuals model behaviors shaped by peer group norms, facilitating the adoption of respectful attitudes and equitable practices. When peer groups normalize behaviors such as intellectual dialogue, empathy, and collaborative interactions, they create an environment that motivates awareness of gender equality and supports respectful relationships. Asch's (1951) conformity studies further illustrated how individuals align their beliefs or actions with group norms to gain acceptance, showing how peer group norms can amplify awareness of societal values, such as gender respect, and promote behavioral change. Thus, peer group norms serve as a powerful catalyst in fostering awareness, building knowledge, and shaping schoolboys' respectful behaviors toward schoolgirls, ultimately contributing to a more equitable and harmonious social environment.

From a sociological perspective, peer group norms act as a mechanism that motivates collective behaviors and shared understandings, which are crucial for fostering awareness and knowledge building, particularly in shaping respectful behaviors of boy students toward

girl students. The structural-functionalist approach, as proposed by Durkheim (1893), regarded norms as essential for maintaining social cohesion and order. Peer group norms motivate individuals to align their actions with collective values, promoting shared identity and responsibility, which contributed to the cultivation of gender respect and equitable relationships (Ridgeway & Correll, 2004). By moderating individual behaviors to fit group expectations, these norms create an environment where respect for girl peers is encouraged, and the importance of equality and mutual understanding is reinforced. Symbolic interactionism, as developed by Mead (1934), highlighted the role of social interactions within peer groups in shaping self-awareness and cognitive development. Peer group norms motivated learning by facilitating role-taking and active engagement in interactions (McGuire et al., 2015). These processes have allowed boy students to internalize shared values, such as respect and empathy toward girl peers, fostering greater awareness of gender equality (Parsons, 2013). The ongoing dialogues and social exchanges within peer groups encourage schoolboys to understand and appreciate diverse perspectives, thus supporting the development of respectful behaviors. Vygotsky's sociocultural theory (1978) asserted that learning and awareness are fundamentally social processes mediated by interactions within cultural and social contexts. Peer group norms served as a framework that motivates collaborative learning and supports the co-construction of knowledge (Lave & Wenger, 1991). When these norms promote intellectual curiosity and respectful dialogue, they encouraged schoolboys to engage in critical thinking and adopt behaviors that reflect respect toward schoolgirls (Mercer & Howe, 2012). By normalizing mutual respect and gender sensitivity within peer groups, these norms significantly influence the development of equitable and harmonious social interactions.

The influence of peer group norms on awareness and knowledge building, particularly regarding their impact on boy students' respectful behavior toward girl students, remains a subject of debate. Some scholars argue that peer group norms strongly stimulate awareness and knowledge building, significantly shaping schoolboys' attitudes and behaviors toward respect for schoolgirl peers. For instance, Simons & Farhat (2010) emphasized that positive peer group norms foster pro-social behaviors, including respect and empathy, by promoting collective values and shared understanding within social groups. Similarly, Bandura's (1986) social cognitive theory highlighted how modeling and reinforcement within peer groups can amplify respectful behaviors through the normalization of gender-sensitive attitudes. However, others contend that peer group norms provide only weak stimulation for awareness and knowledge building, resulting in limited influence on boy students' respectful behavior toward girl students. Critics argue that, in the absence of strong and consistent peer

reinforcement, negative or indifferent norms may prevail, thereby failing to adequately encourage respectful interactions. Asch's (1951) conformity studies demonstrated that the effectiveness of peer group norms in shaping behavior is highly context-dependent, suggesting that weak or ambiguous norms may lead to minimal changes in attitudes or behaviors toward gender respect. This ongoing debate highlighted the complexity of the relationship between peer group norms, awareness, knowledge building, and respectful behaviors.

Peer group norms play a crucial role in shaping students' behaviors and attitudes, including respect between boy and girl students. In Southeast Asia, several initiatives have effectively utilized peer group norms to promote awareness and knowledge building, thereby influencing respectful behaviors among students. Based on "Connect with Respect: Preventing Gender-Based Violence in Schools", UNESCO (2018a) emphasized the importance of peer group norms in fostering respectful relationships among students. It provides strategies for educators to build students' knowledge, attitudes, and skills necessary for respectful interactions, thereby reducing gender-based violence in schools. The resource highlights the role of peer groups in reinforcing positive behaviors and attitudes towards gender equality. Moreover, UNESCO (2018b) discussed how schools can leverage peer group norms to create safe and inclusive learning environments. It emphasizes the importance of fostering positive peer interactions to promote gender equality and respect between boy and girl students. The report provides examples of how peer groups can influence behaviors and attitudes towards gender equality in educational settings. Thus, we have the third hypothesis that:

H3: Peer group norms positively moderate the relationship between awareness & knowledge building for schoolboys and respectful behavior in the 4.0 era.

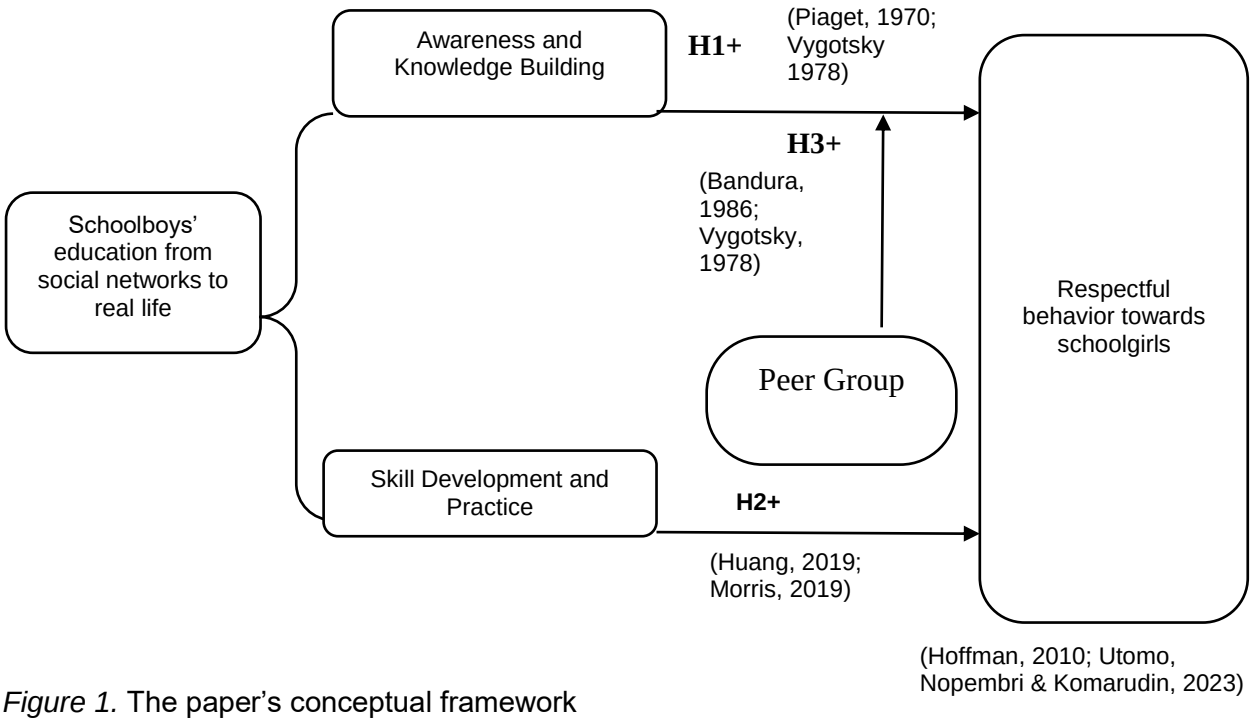

Figure 1. The paper's conceptual framework

Method

Research Approach and Strategy

In this study, we have opted for a quantitative research approach. As stated by Creswell & Creswell (2018), this method involved the collection and analysis of numerical data to investigate and validate phenomena. By leveraging statistical techniques, this approach enabled the examination of data to derive objective and measurable conclusions (Babbie, 2010). Through this process, we aimed to address the research questions effectively and identify relationships between variables. The study employed a deductive methodology, closely aligned with the quantitative approach, to facilitate the formulation of inferences, make predictions, and validate hypotheses using statistical evidence.

Participants

Scientific research typically used two main sampling strategies: probability sampling and non-probability sampling (Bryman, 2012). In this study, a probability sampling strategy was chosen to increase the precision of the findings. The survey used a 5-point Likert scale to collect responses in numerical form, with participants indicating their level of agreement on a scale from 1 "totally disagree" to 5 "totally agree" (Brown, 2011). The survey questionnaires were distributed in person and online through the websites of local high schools, colleges, and Asian institutions where international students from various Asian regions study. For the

sampling technique, a stratified sampling method was used, ensuring that 50% of the respondents were from Asian countries while the remaining 50% were local participants. According to Krejcie & Morgan (1970), a sample size of 260 is appropriate for social and behavioral research, especially for studies involving a defined population. Then, a simple random sampling method was applied to select 260 respondents from the 632 valid observations collected. The sample was then stratified by age: 50% (130 participants) were adolescents aged 13 to 19, 25% (65 participants) were college or university students aged 20 to 22, and 25% (65 participants) were working adults aged 23 and older.

Reliability Analysis

All the participants' answers were measured by a five-point Likert-type scale from 1 (totally disagree) to 5 (totally agree). The results coming from SPSS analysis report the Cronbach's alpha coefficients that are widely accepted indicators of internal consistency in assessing scale reliability and measuring the precise variable (Cronbach, 1951). A scale is considered reliable when Cronbach's Alpha is ≥ 0.7, indicating acceptable one-dimensionality and internal consistency (Hair et al., 2010). To evaluate the contribution of each item, Corrected Item–Total Correlation should be ≥ 0.3; items falling below this threshold may indicate poor alignment with the overall scale and thus warrant removal (Gliem & Gliem, 2003). Furthermore, the "Cronbach's Alpha if Item Deleted" value is examined in tandem; if removing an item increases the Alpha value and its Corrected Item–Total Correlation is < 0.3, that item is excluded to enhance overall reliability (Tavakol & Dennick, 2011). This methodological approach ensures the measurement tool captures the construct consistently across items, strengthening its psychometric validity in empirical studies.

Table 1.
Item-Total Statistics, Cronbach's Alpha (.897 N =4) of dependent variable RB.

Scale	*M* if Item Deleted	Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
RB1	10.17	13.768	.812	.842
RB2	9.25	11.801	.777	.850
RB3	9.27	12.335	.703	.761
RB4	10.20	13.478	.805	.862

Where RB1, RB2, RB3, RB4 are coded for survey questions 1, 2, 3, 4 of the dependent variable Respectful behavior (RB) respectively. Each sub-variable under *Respectful behavior* showed a corrected item-total correlation coefficient of 0.3 or higher. The Cronbach's Alpha coefficient was calculated as 0.897, significantly exceeding the recommended threshold of 0.6 and showing higher values than the Cronbach's Alpha if any specific item were removed.

Additionally, the Cronbach's Alpha for item deletion was higher than the corrected item-total correlations across all sub-variables. Similar findings were observed in the Cronbach's Alpha analyses of the others. Consequently, the statistical table below presented the final test results for each variable group (AKB, SDP, PGN stand for “Awareness & Knowledge, Skill & Development Practice and Peer Group Norms respectively):

Table 2.
The results of the final test of each group of variables

Variable	Number of sub-variables before test	Number of sub-variables after test	Cronbach's Alpha	Name of eliminated sub-variables
RB	4	4	.897	None
AKB	4	4	.761	None
SDP	4	4	.813	None
PGN	4	4	.790	None

Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) is employed to assess the construct validity of the measurement scale by evaluating both convergent and discriminant validity. Convergent validity ensures that observed variables converge on the same latent factor, while discriminant validity confirms that these variables are distinct from those of other constructs. EFA reduces a large set of observed variables into fewer latent factors, using Principal Component Analysis and Varimax rotation to clarify factor structure (Field, 2013). According to Hair et al. (2010), factor loading coefficients reflect the correlation between observed variables and latent constructs and loadings ≥0.5 are appropriate for sample sizes over 120, enhancing the robustness of the factor structure, indicating practical significance and supporting convergent validity. Thus, EFA serves as a critical step in validating the theoretical structure of the proposed measurement model.

Table 3.
Rotated Component Matrix.

Component with loading factors							
1		2		3		4	
RB1	.688	AKB1	.705	SDP1	.698	PGN1	.683
RB2	.876	AKB2	.822	SDP2	.715	PGN2	.584
RB3	.930	AKB3	.727	SDP3	.782	PGN3	.844
RB4	.850	AKB4	.901	SDP4	.808	PGN4	.745

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 7 iterations.

Where AKB1, AKB2, AKB3, AKB4; SDP1, SDP2, SDP3, SDP4; PGN1, PGN2, PGN3, PGN4 are coded for survey questions 1, 2, 3, 4 of the two independent variables AKB, SDP and the moderator one PGN respectively

The rotated component matrix organized the 16 sub-variables into four distinct factors, with no sub-variables being excluded during the process. All sub-variables had factor loading coefficients exceeding 0.5.

Linear Regression Analysis

The statistical significance of hypotheses in a multiple regression model is commonly assessed using the t-test for each regression coefficient. In this context, the null hypothesis states that the coefficient of the independent variable equals zero, while the alternative hypothesis suggests that the coefficient is significantly different from zero. When the p-value associated with the t-test is less than the conventional threshold (typically 0.05), the null hypothesis is rejected, indicating that the predictor significantly contributes to explaining variance in the dependent variable (Shrestha, 2020).

Moderator Analysis

Moderator analysis examines whether the relationship between independent and dependent variables changes under different levels of a third variable. The interaction term's p-value (< .05) indicates statistical significance, while the standardized coefficient (β) reflects effect strength. Cohen (2013) classifies β < .1 as weak, .1 – .3 as moderate, and ≥.3 as strong. This framework is widely used in quantitative research to assess moderating effects (Hayes, 2018), supporting nuanced interpretations of variable interactions.

Results

Table 4.

Descriptive Statistics of the dependent variable: Respectful behavior (RB)

		RB1	RB2	RB3	RB4
N	Valid	385	385	385	385
	Missing	0	0	0	0
M		4.66	4.35	4.10	4.86
Mode		4	5	4	5
SD		.636	.338	.742	.727

The mean of RB1, which was 4.66, suggested that, on average, respondents totally agreed that Respectful behavior involves treating individuals as equals, fostering a positive environment, and adhering to social norms that promote mutual understanding and harmony. The mode of RB1, recorded as 4, indicated that the majority of participants agreed that Respectful behavior entails treating others as equals, creating a supportive atmosphere, and following social norms that encourage mutual understanding and harmony.

Table 5.
Multiple Linear Regression Model Coefficients

Model		*B*	Std. Error	Beta	*t*	*p*
1	(Constant)	6.458	.325		4.482	.000
	AKB	.847	.084	.827	4.152	.000
	SDP	.625	.065	.690	5.000	.000

a. Dependent Variable: RB

Where **RB**: Mean of RB1, RB2, RB3, RB4; **AKB**: Mean of AKB1, AKB2, AKB3, AKB4
SDP: Mean of SDP1, SDP2, SDP3, SDP4; **PGN**: Mean of PGN1, PGN2, PGN3 PGN4

Table 5 indicated that the significance level p = .000, obtained from the t-test for the two variables, is lower than α = .05. This result suggested that the two independent variables of AKB & SDP had a significant impact on the dependent variable, which was Respectful Behavior towards schoolgirls. Consequently, the two hypotheses were accepted and multiple linear regression equation is as follows: RB = **0.827** AKB + **0.69** SDP + u

Table 6.
Moderator results of PGN variable, N = 260

R	R^2	MSE	*F*	*dl1*	*dl2*	*p*
.536	.390	.107	8.273	3.000	256.000	.000
	coeff	se	*t*	*p*	LLCI	ULCI
Constant	4.137	.044	89.305	.000	4.051	4.302
AKB	.327	.075	.217	.000	.196	.157
PGN	.414	.099	5.535	.000	.277	.459
Int_1	.550	.082	4.787	.000	.333	.476

The findings indicated that AKB influences RB, as evidenced by a p = .000 < .05, and PGN also impacted RB with a p = .000 < .05. According to the theoretical framework, when the interaction between AKB and PGN significantly affects SE, it demonstrated that PGN played a moderating role in the relationship between AKB and RB. Additionally, the p-value for Int_1 is 0.000 < 0.05, confirming that the interaction between AKB and PGN affected RB. This result supported the conclusion that PGN moderated the relationship between AKB and RB. The standardized coefficient for Int_1 is .55, which was greater than 0, indicating that an increase in PGN amplified the influence of AKB on RB. As a result, the authors accepted hypothesis H3, stating that Peer Group Norms positively moderated the effect of Awareness & Knowledge Building on Respectful Behavior towards schoolgirls in the 4.0 era.

Discussion

The linear regression results showed that the Awareness & Knowledge building (AKB) had the strongest influence (.827) on the Respectful Behavior towards schoolgirls (RB), and Skill & Development practice (SDP) elements had a significant impact (.69). Plus, the peer group norms were the variable moderating the fair influence of the Awareness and knowledge building impact on Respectful Behavior towards schoolgirls with coefficient of .55.

The findings of this study elucidated the critical determinant of awareness and knowledge building in shaping schoolboys' respectful behavior towards schoolgirls within the industry 4.0 context, yet they spark contentious debates across Asian regions. Drawing from the findings, it is evident that cultivating respectful behaviors through educational interventions, bolstered by digital tools such as AI-driven simulations and gamified learning, aligned with Vygotsky's (1978) sociocultural theory and Bruner's (1960) emphasized on collaborative learning, as demonstrated in successful initiatives like GEMS (Achyut et al., 2011). The finding was consistent with Bruner (1960) that collaborative learning played a significant role in shaping respectful behaviors. However, critics contended that the digital sphere often perpetuates harmful gender norms, as highlighted by the European Parliament (2023). Moreover, the findings validated the proposed hypothesis, as the Theory of Planned Behavior underscored the pivotal roles of peer norms and perceived behavioral control in guiding respectful conduct. Nevertheless, peer group influences, particularly in patriarchal Asian societies, frequently exacerbated rather than mitigated gender biases. (Brehmer, 2023). Such conflicting perspectives reflected broader cultural tensions in Asia, where rapid technological advancements coexist with traditional norms that may resist change. Along with previous studies, Agarwal et al. (2024) advocated for leveraging social media to drive youth activism, yet Adegboyega (2020) cautioned against its inconsistent impact, exacerbated by inadequate supervision. This emphasized that there was a need for context-specific strategies that integrate Industry 4.0 technologies while addressing sociocultural challenges to cultivate enduring respect among youth.

The findings supporting the second hypothesis that skill development and practice positively influence schoolboys' respectful behavior towards schoolgirls in the 4.0 era hold important implications for the Asian context. Based on these findings, technologies like AI-powered learning tools and digital platforms offer opportunities for interactive and experiential education, yet they also elicited scholarly discourse about their fit within diverse cultural settings in the era of Industry 4.0. We concurred with Bandura (1986) that Social Learning

Theory emphasized the importance of role models in shaping behavior, but in many Asian classrooms, traditional teacher-centered methods may conflict with the use of gamified learning or AI-driven simulations designed to foster respect (Belinski et al., 2020). Similarly, the results reinforced that the Theory of Planned Behavior (Ajzen, 1991) underscored the influence of peer norms, but in collectivist societies, hierarchical structures and deference to authority may hinder open discussions essential for shaping moral norms (Brehmer, 2023). Huang (2019) asserted that skill development is shaped by cultural capital, emphasizing the influence of social and educational contexts on gender interactions. Accordingly, Morris (2019), through John Dewey's Theory of Experiential Learning, further supported the notion that practical experience is key in developing these behaviors. These tensions highlighted the need to balance technological innovation with cultural sensitivity, ensuring that educational interventions remain effective and contextually appropriate in promoting respect.

The findings regarding the third hypothesis revealed that peer group norms served as a significant moderating factor, enhancing the relationship between awareness and knowledge building for schoolboys and their respectful behavior towards schoolgirls in the 4.0 era. With a coefficient of .55 (Saunder et al., 2016), indicating a fair moderating effect, peer group norms amplified the internalization of shared values, fostering gender sensitivity and respectful conduct. However, this implication is contentious within Asian contexts where societal norms often vary dramatically. Some regions emphasized collectivism and moral education, fostering alignment with positive peer group norms (Bandura, 1986). Conversely, others grappled with entrenched patriarchal attitudes that challenged the effectiveness of such norms in reshaping behaviors (Asch, 1951). The advent of Industry 4.0 technologies, including AI-driven platforms and gamified learning, further complicated these dynamics, as they both supported and disrupted traditional educational models (Nowell et al., 2020). Additionally, this ongoing debate underscored the sociocultural complexity in leveraging peer group norms to mitigate gender disparities in Asian educational settings.

Practical Implications

Awareness and knowledge building are foundational elements in shaping respectful behavior, as evidenced by a standardized coefficient of 0.827 **(H1)**. Workshops encouraging respectful behavior among boy students towards girl students have been highly successful in Southeast Asia. Programs like the "Gender Equity Movement in Schools" (GEMS) effectively raised awareness about gender equality and fostered respectful interactions through group activities and discussions. European countries could adopt similar programs to promote gender respect in both virtual and real-world contexts. Recent studies emphasize the

importance of integrating digital tools, such as AI-driven educational simulations, to reinforce awareness campaigns. Moreover, research by Gul and Samina (2023) highlighted how male students' attitudes can significantly shift when exposed to structured awareness programs that challenge gender stereotypes. Implementing such approaches in Europe would support the cultivation of gender equality and respectful behaviors in some Asian regions.

Skill development and practice are crucial in fostering respectful behavior with a standardized coefficient of 0.69, showing a statistically positive impact **(H2)**. Recent interventions, such as Cambodia's life-skills training program, demonstrated that structured role-playing exercises and experiential learning can build empathy and respect. Furthermore, studies like those by Darnell, Fowers, and Kristjánsson (2022) emphasize Aristotle's concept of "phronesis," or practical wisdom, highlighting how repeated real-world practice helps embed respectful behaviors. In global contexts, integrating AI-based simulations and gamified learning experiences has been shown to enhance skill acquisition and behavioral change, particularly in educational settings

According to the research results, peer group norms played a significant role in promoting gender respect and sensitivity, with a standardized coefficient of 0.55 **(H3)**. Recent studies, such as those by Simons-Morton and Farhat (2010), have shown that positive peer norms significantly influence gender sensitivity and respect. In Southeast Asia, UNESCO's "Connect with Respect" initiative leveraged peer group interactions to foster positive behavior change, with measurable success. Globally, programs like HeForShe have demonstrated how engaging male students in discussions about gender equality within peer-led frameworks can amplify societal impact. Additionally, Brehmer's (2023) findings underscored the importance of perceived moral norms within peer groups in guiding behavior, suggesting that creating environments of mutual accountability and support can drive sustainable change.

Limitations

The research process faced several significant limitations. A lack of comprehensive literature specifically addressing the impact of boys' education on fostering respect toward girls in the 4.0 era hindered theoretical grounding. Additionally, since the study was conducted in a limited number of foreign and local educational institutions in Vietnam, the findings may be context-specific and may not be generalizable to similar cases in other parts of the world.

Direction for Future Research

Future research on the impact of schoolboys' education on respectful behavior toward schoolgirls in the 4.0 era should explore several critical areas. First, longitudinal studies are necessary to evaluate the long-term effectiveness of educational interventions aimed at

fostering respect, bridging the gap between virtual and real-life behaviors. Researchers should also investigate the intersection of social media influence, peer group norms, and education, particularly how these dynamics collectively shape gender respect. Expanding the focus to diverse cultural and regional contexts can reveal variations in how respect is understood and practiced. Additionally, integrating innovative digital tools like AI-driven simulations or gamified learning into educational frameworks could provide deeper insights into enhancing engagement and outcomes. Future work should also examine strategies to address entrenched cultural and societal biases, ensuring interventions are both effective and inclusive. Collaborative efforts between educators, policymakers, and technologists will be essential to sustain impactful change.

Conclusion

In this research paper, we have thoroughly analyzed the impact of targeted education programs on fostering respectful behavior among schoolboys towards schoolgirls in the 4.0 era. The study has highlighted both internal and external factors that significantly influence this dynamic. Internal factors, particularly awareness and skill development, were shown to play a pivotal role in shaping attitudes and behaviors. Moreover, the moderating role of peer group norms emerged as a crucial element in amplifying the effects of educational interventions. Our findings underlined the importance of integrating modern technologies, such as AI-driven platforms and gamified learning, into educational frameworks to enhance engagement and outcomes. However, the influence of entrenched societal norms and the complex effects of social media require further exploration. The study also acknowledges its limitations, such as the variability of cultural contexts and the challenges in isolating educational impacts from broader societal influences. By addressing these challenges, future research can provide more comprehensive insights and actionable strategies. This work underscores the critical role of tailored educational initiatives in bridging the gap between digital interactions and real-life respect, contributing to the broader goal of gender equity in academic and social spaces.

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