The effect of social interaction on academic performance: The moderating influence of cultural background

Abeer Alraggad[1*]
[1]Zarqa University, Jordan; aalraggad@zu.edu.jo (A.A.).

Abstract: This study seeks to examine the impact of social interactions, including cooperation, containment, conflict, and competition, on a student's academic performance in Jordan. In addition, it aims to determine how the cultural context influences the associations between such social interactions and accomplishments. The data obtained from Zarqa University and the University of Jordan were used to carry out descriptive statistics on the demographic of the participants, as well as to assess the major variables. Social interactivity with culture as a moderating factor was analyzed using structural equation modeling with SmartPLS to examine the relationship between social interactions and academic performance. A reliability and validity test is conducted on the measurement model by taking into account factor loadings, composites, and average variances. The structural model tests the paths of the proposed hypotheses by estimating path coefficients, t-values, and R² values of the relationships. Ethical clearance is provided by the ethics boards of the two universities for data collection, which is conducted within 2-3 weeks using class or online surveys. This study provides evidence of how certain social interactions and cultural aspects affect performance in university education.

Keywords: *Academic performance, Cultural background, Instruments validation, Social interaction.*

1. Introduction

Academic performance is one of the most important factors that is placed in focus in education as it shows the breadth of achievement of students as well their preparedness for any future academic or non-academic endeavors [1]. Among the many elements that determine academic success, social interactions such as cooperation, containment, conflict, and competition occupy a central place [2]. These interactions also encompass students' participation, or lack of it, in formal and informal learning activities, and how they deal with their classmates, teachers and academic tasks. Maximizing on the importance of social interaction in a student's academic performance is paramount, particularly in some cultural contexts such as Jordan, where social relations and educational systems are closely linked. In the case of the Jordanian education system, interpersonal relationships are integral in determining the educational paths of students [3]. The cooperation is of great assistance in addressing the issues, often promoting teamwork and mutual understanding, and is highly commended in the classrooms. Containment, or emotional and interpersonal care and support, establishes a nurturing environment that enables students to cope with problems and other difficult situations. On the other hand, conflict may occur in interactions with peers, and these relationships may affect a student's school performance, especially when the conflict is constructive (that is thought provoking) or destructive (that is tense and disengaging). And, competition is equally double sided, it can be an inspiration for students to do their best in class or bring about too much stress and pressure, especially in a society that looks up to intellectual prowess [4, 5].

The above context highlights the importance of the cultural dynamics of the Jordanian society for understanding the learning cultures in them, so how do they play out in the students of higher education, Jordan being a collectivist society, strong emphasis is made towards working together and

seeking pleasing relations with everyone involved, which could greatly influence how these students view social relations in classrooms. However, due to globalization's increasing power, there is more room for competition and all other features related to being individualistic – in cities and in private schooling systems for instance. The outlines outlined here point out the significance of cultural background as a moderating factor in the social and academic interaction and output interplay [3]. In spite of the positive impact of social interactivity, which enhances academic performance, there is a sparseness of research which seeks to examine how these interactivities affect students in the Jordanian educational context. As cooperation, containment, conflict, and competition constitute the social fabric of the classroom, the role of these social activities on students' academic performance in Jordan is yet to be determined. Similarly, due to cultural variables, for instance, collectivism in Jordan and the greater impact of globalization, there is a possibility that these variables moderate such interactions leading to different effects in other cultures. Considering the intricacies of the educational landscape in Jordan and the variation in students' social experiences, it is important to understand the role of culture in moderating the effectiveness of different types of social interaction in enhancing academic performance. The objectives of the research work would address how social interactions that include cooperation, containment, conflict, and competition affect academic performance among students studying in Jordan [6]. More specifically, it aims at understanding the moderating role of cultural background in these relationships. The classroom setup in Jordan is a mixture of collectivistic cultures and modern influences, which makes the educational system of Jordan unique, this complexity can be expected to differ across cultures [6, 7]. This study is particularly devoted to educators in Jordanian schools and will therefore provide assistance to policymakers in understanding how to adjust the practices of group work for maximum academic output, keeping in mind the cultural realities that affect the student's interest. This is key to effectively tackling the needs of the students in the context of a fast changing education environment characterized by the presence of customary approaches and modern practices.

2. Aim of the Study

The objective of this study in general is to assess the consequence of social interactions, namely cooperation, containment, conflict, and competition, on teaching and learning performance among students in Jordan [8, 9]. It addresses the question of how such interactions enhance or detract from the academic experience of students and their respective outcomes in the context of the culture and education system in Jordan. Besides, this study attempts to assess the moderating effect of culture in the relationship between social interactions and academic performance, in order to illustrate how cultural aspects affect the applicability of these interactions. Through tackling these objectives, the study seeks to make significant policy recommendations for teachers and decision-makers so as to improve education, such as considering cultural issues and social relations [10].

3. Research Questions

1. How do social interactions (cooperation, containment, conflict, and competition) affect academic performance among students in Jordan?
2. How does cultural background moderate the relationship among social interactions and academic performance?

4. Literature Review

4.1. Social Interactions and Academic Performance

Social interactions have an effect on all students' thinking, feeling, and social growth, thus are essential for learning. Collaboration is essential to learning and research indicates that working together enables students to exchange ideas, solve problems and do better academically [11]. However, Constructive conflict enhances critical thought and problem-solving abilities; thus, these aspects lead to higher academic performance. The other form of conflict however that is destructive in nature, results in

stress, disengagement and low academic performance [12, 13]. Competition has a similar effect as conflict albeit slightly different. On the one hand, healthy competition gives the desire to perform better in students, however, too much competitiveness leads to worry and burnout, especially with education systems based on high-stakes tests [14, 15].

4.2. Cultural Background as a Moderating Factor

Cultural Background greatly determines how students participate and perceive social activity. In Jordan for instance, which can be classified as a collectivist society, there is a great emphasis on students helping each other in class. On the contrary, globalization has introduced, particularly in urban areas and private schools, a tendency towards individualism where competition is more pronounced [7, 16]. Earlier research has established evidence that cultural norms and values can account for the relationship between social interaction and academic performance. For instance, research in East Asia has found that the integration of collectivist elements to aid in the educational process to be very useful [17]. In contrast, individualists are more likely to experience competition as a motivation [18]. However, little is known about this interplay in the context of Jordan, where traditional values and contemporary education systems coexist.

4.3. Gaps in Existing Research

In consideration of the plentiful social involvement and achievement works, there prevails an absence of studies that take their settings within other dominions than the confines of western or east Asian regions. There is thus an unfulfilled understanding of how the fusion of arab vertical individualism along with globalization creates a massive impact on the educational system. One such research gap is how these modalities socialize in Jordanian women. What is more research conducted within Jordan regarding education lax and is mostly filled with the examination of the broad impacts aiming to solve key issues [19, 20]. In respect of this evidence-based set framework, this research analyzes the effects of social interactions, being: cooperation, containment, conflict, and competition on academic achievements in Jordanian schools. The paper comments on the moderating role of social interactions on high achievers while tackling cultural dynamics existent within Jordan. Emphasis upon such a setting, further helps bolster existing argues of the interaction between social dynamics and education being factor conducive for an ever growing and rapid feministic society, hence aiding in forming connections both inter and intra culturally by utilizing competition.

5. Research Hypothesis

H_1: There is an association between social interaction and academic performance

H_2: There is association between social interaction and academic performance moderating by Culture Background.
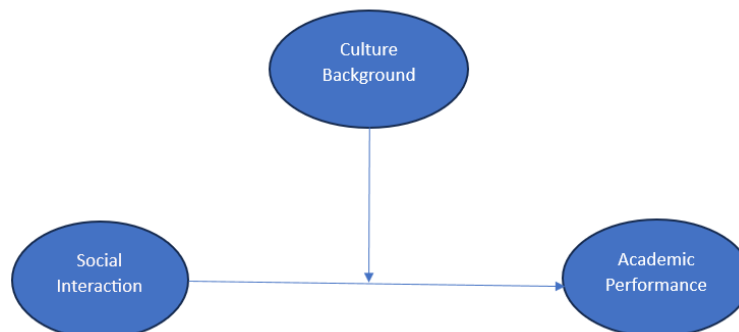
Figure 1.
Conceptual framework.

6. Methodology

In this study, we utilize a quantitative method to examine the impact of social interaction on academic performance, as well as the impact of cultural background as a moderating factor, with the data obtained from the universities in Jordan.

6.1. Research Design

The study employed a quantitative research approach that is able to answer the hypotheses questions by employing a survey strategy [21]. The survey measures the effects of social interactions measures cooperation, containment, conflict, and competition on academic performance as well as mediating functions of cultural background. Utilizing a survey strategy enables the authors to collect data in a structured way that allows them to test for relationships between the variables in a coherent manner [22].

6.2. Sample and Participants

The study aims at students that are currently studying at the Education Faculties of Zarqa University and the University of Jordan. These particular institutions were selected to be able to capture different academic and cultural contexts within the borders of Jordan.

- Participant: In all, research seeking to enroll around 200 people will be conducted so as to ensure that there is sufficient statistical power to perform analysis.
- Sampling Technique: There will be much focus on sampling to ensure that gender, academic year, and urban or rural backgrounds are effectively stratified. There will also be a focus on participating students enrolled in education faculties and their willingness to take part in the research.

6.3. Instruments Validation and Data Collection

A thorough examination was conducted so as to validate the findings of the study and employed three expert professionals who provided an in-depth analysis about the findings [23]. The educators were a lecturer in instructional engineering, a professor in educational psychology and a consultant of curriculum design, with great knowledge in the field of Higher Education in Jordan. Through assisting in the research framework and approaches, the experts incorporated the use of social interaction, cultural background, and academic performance, and were able to modify the constructs ensuring relevancy to the questionnaire. This association between social interaction, culture, and academic success also put light on the theoretical basis of the research while also evaluating the methodology which was employed to provide insight into the objectives that were required to be achieved. This addition of the research methodology increases the reliability of the study's results. This adds further detail to the research and the findings based on the demographic data including the participants age, gender, year of college, and ethnicity. In the context of Ukraine's social reflection, new parameters will be introduced which can influence social interdependence, collaboration, rivalry, and conflict [24, 25]. The self-assessment scales will focus on perceived excellence, while the recalled GPA will be set to measure scholastic achievement. Lastly, a questionnaire will be employed which will focus on a participants' culture and their individualistic tendencies versus their collectivist tendencies.

6.4. Procedure

The Zarqa University and the University of Jordan's ethics boards will grant ethical consent for the study. The participants will either complete an institutional survey while in class or furnish data collected through a survey that will be distributed electronically. Accompanying the survey will be a cover letter that explains the objective of the study, guarantees confidentiality, and ensures that informed consent is acquired. The period of gathering data is expected to last between two and four weeks.

7. Data Analysis and Findings

In describing the key variables and demographics of the participants, descriptive statistics will be applied. SmartPLS employ smart analysis for SEM (Structural Equation Model), which will be used to analyze the influence of social interaction on academic performance with cultural background acting as a moderating variable [26]. The measurement model will be assessed for the internal consistency and validity of the constructs through tests of factor loadings, composite reliability, and average variance extracted (AVE). The validation of the structural model will examine the relationships posited in the hypotheses, as well as path coefficients, t-values, and R² values in terms of the magnitude and importance of the relationships [26].

7.1. Evaluation of Measurement Model

As illustrated in table (1), Academic Performance (AP), Culture Background (CB), Social Interaction (SI), and the Moderating Effect (interaction between Social Interaction and Culture Background) were derived from the PLS-SEM analysis. The Academic Performance construct has four indicators (AP1-AP4) of which the loadings are within range 0.526 to 0.805. Most loadings are over the 0.7 acceptable threshold aside from AP1 with a loading of 0.526 which suggests a lesser degree of relevance to the construct in question. The second dependent variable Culture Background has also five indicators (CB1-CB5) with indicator loadings equal to or in between $0.665 - 0.862$, with CB1 being lower that the satisfactory threshold (though not by much). For the Social Interaction seven indicators (SI1-SI7) were used, with the loadings equating to 0.675 and 0.782, clearly showing the metrics to be reliable.

The interaction term's high loading of 1.173 illustrates that the Moderating Effect (Social Interaction × Culture Background) has the high interaction term useful for moderation analysis. The measurement model could be considered consistent, apart from the low loadings which AP1 and CB1 possessed, and may be further explored. These indicators need to be examined for theoretical significance or even measurement error. Also, model fit analysis can be augmented through composite reliability measure, the average variance extracted index, and even Cronbach's Alpha to ensure the construct measurement is valid and reliable. The high loading for the moderating effect also substantiates its usefulness in assessing the impact of interaction on the type of relationship between the variables.

Table 1.
Measurement Model.

	Academic Performance	Culture Background	Moderating Effect 1	Social Interaction
AP1	0.526			
AP2	0.805			
AP3	0.787			
AP4	0.788			
CB1		0.665		
CB2		0.862		
CB3		0.763		
CB4		0.833		
CB5		0.842		
SI1				0.782
SI2				0.714
SI3				0.711
SI4				0.693
SI5				0.675
SI6				0.679
SI7				0.687
Social Interaction * Culture Background			1.173	

Additionally, Table (2) displays the key reliability and validity metrics for the ACCEPT model : Cronbach's Alpha, Dijkstra-Henseler's rho (rho_A), Composite Reliability (CR) and Average Variance Extracted (AVE). It also explains the measure of internal reliability. All the sub variables such as Academic Performance (0.705), Culture Background (0.853), Social Interaction (0.833) surpass this threshold of 0.7 ensuring reliability. This indicates acceptable level of consistency of measurement which is more than an ordinary set of dimensions. The value of Moderating Effect 1 is 1.000 being a single-item construct depicting perfect interaction term. This is the same with rho_A, a predictor of reliability, where all variables are above the 0.7 equal to or greater end benchmark for all constructs set in the study.

In majority of the constructs, Composite Reliability (CR) values are above the threshold of 0.7, signifying the metrics' robustness in validating the indicators. Average Variance Extracted (AVE) then shows that Academic Performance (0.541), Culture Background (0.634), and Moderating Effect 1 (1.000) have sufficient convergent validity since they are able to exceed the 0.5 metric. On the other hand, Social Interaction (0.499), which is below this threshold, indicates that the indicators do not capture the construct such as networking well enough, which may need re-assessment of any measurement items used or improvement on the quality of these indicators. Meanwhile, there are minor issues with the AVE for Social Interaction. Overall, the constructs have good reliability and satisfy validity requirements.

Table 2.
Construct Reliability and Validity.

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Academic Performance	0.705	0.727	0.822	0.541
Culture Background	0.853	0.861	0.896	0.634
Moderating Effect 1	1.000	1.000	1.000	1.000
Social Interaction	0.833	0.840	0.874	0.499

Table 3 provides the summary of the correlation matrix for the constructs: Academic Performance, Culture background, Moderating effect 1 and Social Interaction, with the diagonal elements

representing the AVE for the respective construct. The diagonal values (for example: 0736 for Academic Performance, 0796 for Culture Background and 0707 for Social Interaction) demonstrate that each construct possesses reason in explaining some of the variance within its indicators which step towards meeting the Fornell-Larcker Criterion for discriminant validity. The other diagonal entries depict the associations that exist between the constructs, for instance; the moderate positive associations of Academic Performance and their Culture Background and Social Interaction (0.667 and 0.682 respectively) and the relatively high association which exists between the Culture Background and Social Interaction (0.746). On the other hand, the correlation values of the Moderating Effect 1 with the other three constructs are inversely related with values of -0.264, -0.297 and -0.369 respectively, indicating that the interaction term might have a suppressing or antagonistic effect on these relationships. This implies that there are dependable constructs which relate to each other but the moderating effect adds to the intricacy meaning that further structural analysis is needed.

Table 3.
Discriminant Validity Matrix

	Academic Performance	Culture Background	Moderating Effect 1	Social Interaction
Academic Performance	0.736			
Culture Background	0.667	0.796		
Moderating Effect 1	-0.264	-0.297	1.000	
Social Interaction	0.682	0.746	-0.369	0.707

Consequently, the results suggest the goodness-of-fit of the Estimated Model is satisfactory. The SRMR which is 0.078 remains below the acceptable level, and the distance measures (d_ULS = 0.823, d_G = 0.272) are similar to those of the Saturated Model, implying that there is little difference between the values that were observed and those that were predicted. Further analysis shows that the Chi-Square value (301.482) is lower for the Estimated Model indicating that it produced a better fit, this is coupled with NFI value which is equal to 0.799 which indicates that the fit is reasonable but there is scope for improvement. From these results, it may be concluded that the model fitted the data to a reasonable degree.

7.2. Evaluation of Measurement Model

In Figure 2, the relationships between factors are examined, and their impact on academic achievement is assessed. This is relevant to students at Jordan University and Zarqa University in Jordan. There is a relationship between Cultural Background and Academic Performance, which is significant, and has an Original Sample effect (Original Sample = 0.356, p = 0.000), implying that Cultural Background is one of the important factors determining the outcome of academic performance in these institutions. Likewise, Social Interaction and Academic Performance has a Primary Sample effect that is significantly positive (Original Sample = 0.414, p = 0.000), whereby the key contribution of social interactions in performance is clearly brought out. On the other hand, the moderating relationship that Cultural Background had on Social Interaction and Academic Performance does not qualify as significant (Original sample =-0.005, p=0.921), since the p value is greater than the acceptable value of 0.05. This non-significance shows that cultural background will not substantially influence the impact of social interaction on academic performance. In a bid to counteract this finding, future scholars should seek to establish if other layers of cultural background such as regional or family cultural background have the moderating influence. Moreover, a more diversified data or a larger research sample would enable an accurate analysis of this association.
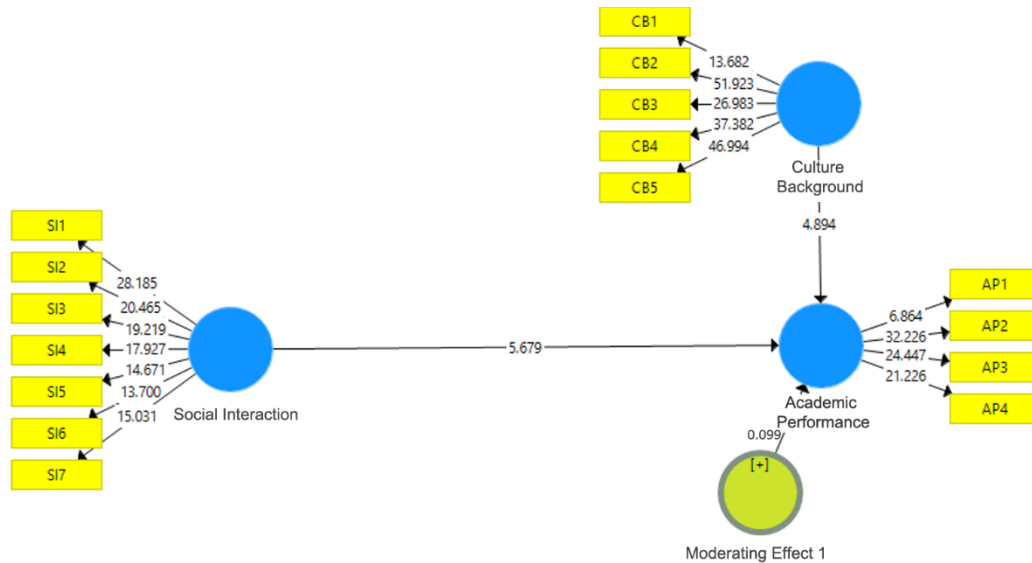
Figure 2.
Structural Equation Model.

8. Discussion

The goal of the conducted research was to establish how social interactions initiated by cooperation, containment, conflict, and competition relate to academic achievement, and to further this goal, the study examined the intervening role of cultural context. These findings presented in the results section will be helpful in understanding how social and cultural background affects the academic performance of students in the Jordanian context with specific reference to students of Zarqa University and the University of Jordan.

8.1. Social Context and the Ability to Study

Out of the study's most critical findings, it draws a significant conclusion regarding the relationship of social interaction and academic performance turning out to be significant and positive (original sample = 0.414, p = 0.000). Such outcome corroborates with existing studies which argue that social interactions within an academic setting whether in the form of cooperation or competition can be beneficial for the students [27]. Session concerning cooperative interactions, where students strive towards the same goal, are understood to be useful for knowledge retention, problem-solving, and overall achievements in studies. In addition, other social interactions such as friendly competition are likely to be sources of motivation and drive to students enabling them to reach other levels of achievement [28].

This necessity for comprehensive social interaction is very evident for motivation purposes as it explains the position of universities in improving/perfecting the methods of teaching. As the universities begin to implement more of the collaborative teaching methods, this observation greatly emphasizes the idea of peer-to-peer interaction where improvement in academic performance is to be witnessed.

8.2. Cultural Background and Students' Academics

The research also uncovered a notable link that exists between a cultural background and academic performance which is positive (Original Sample = 0.356, p = 0.000). This gives evidence that suggests that the students' academic performance is affected by cultural values that they possess such as norms and even practices. Such factors as self-discipline, motivation, importance of education and responsibility

can be shaped by cultural background. For example, the students whose cultures encourage them to work hard in academics end up working much harder than the rest and therefore get better grades (Cheng & Kuo, 2014). These results are consistent with the proposition that academic success is affected by a student's social and cultural background such as motivation, expectations, and approach to learning. Societal expectations, family participation, and community values as a few of those cultural factors positively can help prevent a negative atmosphere for performance. In animations, this puts students and hence educators in a better position to study culture while on learning behavior.

8.3. The Influence of Cultural Diversity

Despite the fact that social interdependence and academic achievement are positively and statistically significantly correlated, the level to which this interdependence relationship is affected by cultural diversity was found to be negative. This outcome indicates that American culture had no significant impact in this study. Social engagement is not of significant consequence to learning while considering performance in America. Each ethnic group's functionality equally is, at birth, determined by them. Generalization of international students' perceptions of the US cultural context might account for lack of significance in terms of interdependence relationship in this context. To begin with, cultural context in which this research takes place might include too many facets in its definition to have a major impact. Ethnic variations in regional definition, family designs, prevailing norms, and societal culture may all shape students' perceptions of social involvement and, therefore, students' activities. A thorough analysis of the core concept enhances understanding of its definition, and in this case, the cultural background needs to be trimmed down from its wide definition to a regional definition or family background. Moreover, an insignificant moderating role might at the same time suggest that the relationship between social interactions and performance is cultural socio economic relevant, especially among students at the universities. This implies that the relationship in question is more moderated by the social aspects of the students in their scholarly contexts and less by the difference in cultures. However, the absence of strong results in this direction is not very much in conflict with the existence of the stronger cultural determinants in academic performance of students. As it is known, culture makes some difference to academic performance but not in the aggregate as outlined above.

9. Limitations and Future Research

Every research comes with limitations and this paper is no exception. Firstly, a limitation is the very simplistic measure of cultural background used. This is only the tip of the iceberg on how cultural elements can potentially explain academic performance. Possible future research can include ethnicity, family orientations, and even geography within Jordan as escalating cultural diversity measures.

10. Theoretical and Practical Contribution

This study adds to the existing research by discussing the relationship between communication, achievement, and culture in the context of Jordanian higher education institutions: Jordan University and Zarqa University. The detailed findings demonstrate that engagement is a strong determinant of academic performance, which is an extension of understanding its importance in educational settings. In addition, the research establishes that culture affects academic performance by a moderate degree while being a strong influencing factor but does not serve as a good moderator between social engagement and academic achievement. Such an accurate perspective also discredits existing theories and opens inquiries into the need and impact of cultural diversity in education. Practically, the research provides useful recommendations to the state and educators of the universities of Jordan. As there is great evidence of social engagement positively affecting academic performance, universities should be able to commit resources to such programs as group learning, peer mentoring, and extracurricular activities. Moreover, the strong influence of cultural background implies that culturally universally customized solutions would improve students' performance. Even when the moderating role of cultural background was not found to be significant, there is still a need for institutions to pay attention to cultural diversity

in the particular design of inclusive curricula and support systems. Those strategies may in turn assist in improving students' academic performance and beneficially affect the students' learning environment.

11. Conclusion

The effect of social interaction on academic performance within the context of cultural background as a moderating variable was analyzed in this work by using data from Jordan University and Zarqa University in Jordan. The results demonstrated that social interaction and cultural background positively and significantly influence academic performance, highlighting their critical roles in shaping students' educational outcomes. Though, it was established that cultural background as a moderating variable did not significantly influence the relationship between social interaction and academic performance, thereby warranting further study of this interaction. The findings underscore the importance of fostering collaborative and inclusive learning environments that utilize social interaction to increase the likelihood of academic success. It is recommended that future studies determine new hypothetical moderating factors for the current study and increase the sample size so that more accurate conclusions can be arrived at. These insights contribute both theoretically, by enriching the literature on social interaction and academic performance, and practically, by guiding educators and policymakers in designing culturally responsive educational strategies.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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References

[1]   O. L. Salami, "Teaching competencies, methodologies, students' engagement and locus of control as predictors of students' academic performance in business education in colleges of education," Doctoral Dissertation, Kwara State University (Nigeria), 2021.

[2]   T. T. York, C. Gibson, and S. Rankin, "Defining and measuring academic success," *Practical Assessment, Research & Evaluation*, vol. 20, no. 5, p. n5, 2015. https://doi.org/10.7275/hz5x-tx03

[3]   A. R. Alawamreh *et al.*, *The effectiveness of online flipped learning using the UTAUT model for outstanding students in Jordan* (Artificial Intelligence, Internet of Things, and Society 5.0). Cham: Springer, 2023.

[4]   R. S. Al-Mawadieh, I. T. Aldarabah, A. Alj-aafreh, A. R. Alawamreh, and M. Angawi, *The extent of fulfilling the requirements of inclusion of special needs children in Jordanian Kindergartens* (Artificial Intelligence and Economic Sustainability in the Era of Industrial Revolution 5.0). Springer. https://doi.org/10.1007/978-3-031-56586-1_35, 2024.

[5]   A. F. Alkhwaldi and A. A. Abdulmuhsin, "Crisis-centric distance learning model in Jordanian higher education sector: Factors influencing the continuous use of distance learning platforms during COVID-19 pandemic," *Journal of International Education in Business*, vol. 15, no. 2, pp. 250-272, 2022. https://doi.org/10.1108/JIEB-01-2021-0001

[6]   S. Arnaouteli, N. C. Bamford, N. R. Stanley-Wall, and Á. T. Kovács, "Bacillus subtilis biofilm formation and social interactions," *Nature Reviews Microbiology*, vol. 19, no. 9, pp. 600–614, 2021. https://doi.org/10.1038/s41579-021-00540-9

[7]   L. L. Scientific, "The effectiveness of online problem-solving strategies and their impact on the achievements of islamic culture in Jordan," *Journal of Theoretical and Applied Information Technology*, vol. 102, no. 5, pp. 1-12, 2024.

[8]   M. Kolhar, R. N. A. Kazi, and A. Alameen, "Effect of social media use on learning, social interactions, and sleep duration among university students," *Saudi Journal of Biological Sciences*, vol. 28, no. 4, pp. 2216-2222, 2021. https://doi.org/10.1016/j.sjbs.2021.01.010

[9]   H. Rawash, A. R. Alawamreh, A. M. Obeidat, and A. Nawafleh, "The effectiveness of problem-based learning in acquisition of knowledge using online learning," *International Journal of Membrane Science and Technology*, vol. 10, no. 3, pp. 997-1007, 2023.

[10]   Y. Wu, "Integrating generative AI in education: how ChatGPT brings challenges for future learning and teaching," *Journal of Advanced Research in Education*, vol. 2, no. 4, pp. 6-10, 2023. https://doi.org/10.56397/jare.2023.07.02

[11]   D. Nguyen and D. Ng, *Teacher collaboration for change: Sharing, improving, and spreading. In S. Swaffield & P. Poekert (Eds.), Leadership for Professional Learning: Perspectives, Constructs and Connections.* Routledge. https://doi.org/10.4324/9781003357384-12, 2022.

[12]   A. R. Alawamreh and N. F. Elias, "Examining the effectiveness of using web-based learning for gifted students: Jordan as case study," *Journal of Theoretical & Applied Information Technology*, vol. 76, no. 2, pp. 160–169, 2015.

[13]   M. Deutsch, *Cooperation and competition. In P. T. Coleman (Ed.), Conflict, interdependence, and justice: The intellectual legacy of Morton Deutsch* Springer. https://doi.org/10.1007/978-1-4419-9994-8_2, 2011.

[14]   I. Al Muala, A. M. Obeidat, A. R. Alawamreh, B. Alhatmi, A. Abo Eiseh, and Z. H. F. Alrhaba, "Unraveling the influence of artificial intelligence, organizational, and environmental factors in strategic planning: Implications and practical insights," *Journal of Theoretical and Applied Information Technology*, vol. 102, no. 4, pp. 1433-1441, 2024.

[15]   M. Şeremet, M. Haigh, and E. Cihangir, "Fostering constructive thinking about the 'wicked problems' of team-work and decision-making in tourism and geography," *Journal of Geography in Higher Education*, vol. 45, no. 4, pp. 517-537, 2021.

[16]   N. Wang, Y. Zhao, R. Zhou, and Y. Li, "Factors influencing users' online information disclosure intention and the moderating effect of cultural background and platform type," *Aslib Journal of Information Management*, vol. 75, no. 6, pp. 1178-1208, 2023. https://doi.org/10.1108/AJIM-04-2022-0218

[17]   X. Chen, Y. Zhang, and P. Li, "The influence of social values on student motivation: A cross-cultural study," *Journal of Educational Psychology*, vol. 106, no. 2, pp. 249-258, 2014.

[18]   D. H. Schunk, P. R. Pintrich, and J. L. Meece, *Motivation and learning strategies for college success: A focus on self-regulated learning*. Boston, MA: Pearson Education, 2008.

[19]   K. I. M. Al-Mseidin and M. A. A. Al-Zu'bi, "The level of social and academic adjustment among syrian refugee students in Jordan and its relation with underachievement students," *International Journal of Childhood, Counselling, and Special Education*, vol. 1, no. 2, pp. 100-111, 2021.

[20]   H. Qawaqneh, F. B. Ahmad, and A. R. Alawamreh, "The impact of artificial intelligence-based virtual laboratories on developing students' motivation towards learning mathematics," *International Journal of Emerging Technologies in Learning*, vol. 18, no. 14, p. 105, 2023. https://doi.org/10.3991/ijet.v18i14.39873

[21]   A. R. Alawamreh and N. F. Elias, "The acceptance of e-learning system for gifted students in developing country (Jordan Case Study)," *The Social Sciences* vol. 11, no. 2, pp. 1-4, 2016.

[22]   M. A. Al-Zu'bi, K. I. Al-Mseidin, R. S. Al-Mawadieh, and A. R. Alawmreh, "The impact of ipad applications on learning motivation among preschoolers in Jordan," in *2023 24th International Arab Conference on Information Technology (ACIT)*, 2023: IEEE, pp. 1-7.

[23]   H. P. Kennedy, "Enhancing Delphi research: Methods and results," *Journal of Advanced Nursing*, vol. 45, no. 5, pp. 504-511, 2004. https://doi.org/10.1046/j.1365-2648.2003.02933.x

[24]   A. Alramammnh, O. Al-Sabayleh, H. Abzakh, M. Sakarneh, and A. Alawamreh, "Gamifying learning for enhanced attention: Empowering students with learning disabilities through competence, intrinsic motivation, and technology acceptance," *Educational Administration: Theory and Practice*, vol. 30, no. 6, pp. 2020–2031, 2024. https://doi.org/10.53555/kuey.v30i6.4719

[25]   N. Q. Hammadi, M. A. Mohadat, and A. R. Alawamreh, "Gamification and attitudes in engaging children in the learning process: A case of online math games," *Edelweiss Applied Science and Technology*, vol. 8, no. 6, pp. 9743-9755, 2024. https://doi.org/10.55214/25768484.v8i6.4100

[26]   D. Shi, "Research on the structure model of competitive factors of tourism information systems influencing socio-economic environmental performing arts industry in Anhui Province based on SmartPLS analysis method," *Journal of Information Systems Engineering and Management*, vol. 8, no. 2, p. 22837, 2023. https://doi.org/10.55267/iadt.07.13906

[27]   J. Cohen, "Social interactions and academic performance: The role of cooperation and competition," *Educational Psychology Review*, vol. 21, no. 3, pp. 249-267, 2009.

[28]   D. W. Johnson and R. T. Johnson, "Cooperative learning: The foundation for active learning," *Journal of Higher Education*, vol. 60, no. 1, pp. 1-12, 1989.