Journal of Social & Organizational Matters

Vol 5 No 1 (2026): 415-426

Impact of Virtual Collaboration Skills on Students' Engagement and Academic Performance at University Level

Atika Maqsood[1], Muhammad Akram[*2]

[1]Visiting Faculty, Institute of Education & Research, University of the Punjab, Lahore, Punjab, Pakistan.

[2*]Associate Professor, Institute of Education & Research, University of the Punjab, Lahore, Punjab, Pakistan.

Corresponding author: akram.ier@pu.edu.pk

Keywords: *Virtual Collaboration, Student Engagement, Academic Performance, Higher Education*

DOI No: https://doi.org/10.56976/jsom.v5i1.413

This study explores the impact of virtual collaboration skills on student engagement and academic performance in Pakistani universities, particularly in Lahore. The research used a stratified sampling technique to select 500 students from public and private universities. Three adapted questionnaires measured students' virtual collaboration skills (α=.91), engagement (α=.93), and academic performance (α=.88). Descriptive and inferential statistics were used for data analysis. Results revealed a moderate positive relationship between virtual collaboration skills and classroom engagement (r=.61) and academic performance (r=.65). The study identified virtual collaboration skills as significant predictor of student's engagement and academic performance at university level. It also suggested incorporating virtual collaboration into university curricula and creating effective learning environments to improve student engagement and performance. Recommendations include offering specialized training for virtual collaboration skills and monitoring the success of collaborative projects.

1. Introduction

The virtual collaboration abilities have grown across many educational institutes due to the swift advance digital landscape. In addition of technology in universities has resulted in major transformations, particularly inside educational institutions. The emergence of online learning platforms and virtual collaborative settings has generated considerable interest in the successful participation of students in virtual spaces, given their substantial impact about student engagement and academic achievement (Petare et al., 2023). Teamwork is acknowledged as a competency important for 21st century learning, on the learners' social adaptation abilities. These competencies include settling disputes and problem-solving. Teamwork to facilitates diverse working attitude and improve learners' educational Self-conception. The appeal of online engagement and digital entertainment are two aspects contributing to this advancement (Kumar, 2021).

Online games, Instagram, Facebook, and similar applications frequently involve users to the extent of removing them from their immediate environment. Educators, parents, and leaders will be able to deal with these bad effects if they use technology in a balanced way and provide people chances to work together and build relationships, both online and in person. In a connected society, parents may assist students in developing essential skills (Montag et al., 2019). Encouraging engagement in collaborative efforts and providing guidance on ethical digital citizenship are two methods to do this. Teachers have an important role in the development of collaborative abilities among students using technology (Pirzada, Tabassum & Ahmad, 2024). To address the different needs of students and the difficulties arising from the topic being studied, they modify their approaches, tactics, and learning models. To attain superior outcomes, educators employ diverse tactics, including the facilitation of collaborative learning experiences. Sears, and Reagin (2013) assert that effective collaboration beyond participant quantity; it necessitates a focus on generating better outcomes (Ahmad et al., 2025).

Multiple studies have shown that collaborative problem-solving in small groups significantly improves learning outcomes. This comprehensive technique not only assesses collaborative skills but also facilitates students' progression from primary to advanced educational levels (Akram et al., 2024). Therefore, this educator fostered dynamic interactions and collaborative problem-solving among students by departing from conventional teacher-centered instruction (Huri et al., 2024). Collaboration skills in e-learning era as times where IT facilitate learners’ engagement for support cooperation and collaboration in the acquisition of knowledge and skills. Knowledge can be acquired and collaboration can occur in these environments, irrespective of temporal limitations or in real-time. Therefore, individuals show greater interest in the topic matter throughout the entire method. Furthermore, these skills empower students to collaboratively utilize technology for problem-solving and information sharing. Student engagement is essential for academic performance and successfully performance (Unal & Cakir, 2021; Ahmad et al., 2025).

Educational Activities constitute definitions of student engagement. So, covers significantly many mere student involvements. Now, investigation necessitated a defined that included multiple characteristics (Kahu, 2013). A test or instrument was created to assess

student participation. In the present study, the phrase "Interaction with students" is the mentally, cognitive, affective, and social capacities of students' answers to facilitate learning, including activities pertaining to academic and social engagements both inside and outside the classroom, to achieve successful productivity.in universities students' involvement emphasizes social and campus environments more than in primary and secondary education. Scholars have performed comprehensive investigations on the determinants affecting student achievement at various phases of their educational trajectories.

1.1 Research Questions

1. How do university students describe their virtual collaboration skills, engagement with classes, and academic performance?
2. What is the correlation between virtual collaboration skills and student engagement?
3. What is the correlation between virtual collaboration skills and the academic performance of university students?
4. What is the impact of students' virtual collaboration skills on their engagement in classroom activities?
5. What is the impact of students' virtual collaboration skills on their academic performance?

2. Literature Review

Virtual Collaboration Skills These are abilities enabling individuals to effectively work together remotely, using digital communication tools to share information, manage tasks, and maintain team harmony. Key skills include digital emotional intelligence, understanding digital body language, task coordination, and promoting virtual team connection (XMind, 2023). Student engagement refers to the degree of emotional investment, cognitive challenge, and behavioral involvement a student demonstrates in their educational experience. It involves active engagement, interest in learning, the sense of being secure and a part of the learning community, and long-term motivation to understand complicated concepts (Seddon et al., 2008; Ahmad et al., 2024). Academic performance refers to the effectiveness of an individual in learning activities which is usually assessed in terms of grades, test scores, and classwork, and command of the subject matter. It is an indication of the academic success of students in terms of the cognitive ability, motivation, and learning environment (Logan et al., 2017; Tucker-Drob, 2017). Online collaboration is the application of computers to support collaborative learning which is the digitalization of the traditional collaborative learning in the classroom. The technological progress enables the students to be active contributors to the development of the learning content and also be in charge of their learning process (Simpson & Froyd, 2008; Kolachi et al., 2024). Moreover, the scalable web-based system allows the students to create their own learning spaces, in which they are able to interact and collaborate. Active and positive learning, thorough processing of information, analytical thinking, and goal-oriented education are recognized to be promoted (Jabeen et al., 2023).

The student involvement that puts a specific emphasis on the positive contribution of active and emotional involvement in the learning processes to the educational gains. This clarifies the importance and worth of student engagement in the creation of a favorable learning environment and its role in dampening the effects of virtual cooperation skills on educational

success (Zepke & Leach, 2010; Haider et al., 2024). This literature review is considered to be a comprehensive analysis of the available research, which is the basis of the empirical study conducted in this research. It highlights the need to understand these connections in the framework of the contemporary higher education. The importance of virtual cooperation is much more than the usage of technology. It includes the development of cooperation attitude and development of interpersonal skills that are essential in effective teamwork. Students engaged in virtual cooperation need to successfully manage diversity of opinions, resolve conflicts and make efforts in achieving common goals (Johnson & Johnson, 2013; Naeem et al., 2022).

The necessity to facilitate student engagement is increasingly being recognized in the framework of online and hybrid classrooms. The acceleration of the journey toward digital training caused by the global events such as the COVID-19 pandemic has highlighted the need to utilize the Effective techniques in the engagement involved in the virtual environment (Ahmad et al., 2025). The online learning systems must be designed in a manner that maximizes the aspect of interaction and cooperation to the extent that these are pivotal in maintaining the level of student engagement and motivation. By using interactive technology, e.g. virtual laboratories, simulations, and collaboration tools, student engagement can be significantly enhanced by making the process of learning more engaging and participatory (Faheem et al., 2025).

2. Research Methodology

The current research was descriptive in nature and correlation research design was employed to establish the relationship between Virtual collaboration skills, engagement of students and academic performance of the students in the university level. There were 2 Government and 2 private universities in Lahore that made the population of the study. There were 500 students who were chosen using random sampling methods and they were used in the study. The primary data collection device in this research was modified and used questionnaire. The questionnaire was constructed in such a way that it would evaluate three main concepts, which included virtual collaborative skills, student engagement, and academic performance. It was composed of several sections with a set of Likert-scale items that started with (strongly disagree) and went through 5 (strongly agree). The instrument was designed in a way that is comprehensive but easy to answer by the students by giving the right and sincere answers. The Questionnaire that was used in this study was initially designed and validated by Lee and Kim (2024). The scale incorporates three broad aspects (a) Learning Environment, (b) Learning Design, and (c) Learning Interaction. All the factors showed high internal consistency in the initial study, and it was also claimed that the overall scale reliability was high. In this research, the researcher will use the questionnaire modified to fit the research environment of a university student in Lahore. There were minor modifications in terms of the language and wording to make it more understandable and relevant to the target respondents. The Student Engagement Questionnaire was adopted and adapted from the Student involvement Scale, developed by (Günüç, & Kuzu, 2014), consists of 6 categories and 41 items, accounting for 59% of the difference in student involvement within universities students.

In the present study, engagement was measured through the following factors**:** Valuing**,** Sense of Belonging**,** Cognitive Engagement**,** Peer Relationships**,** Relationships with Faculty Members**,** Behavioral Engagement**,** Study Engagement and Commitment**,** Academic Confidence and Goals**,** and Active Learning and Participation. These factors together formed a total of 60 statements, rated on a Likert-type scale. Content validity was ensured through expert review by three specialists, and reliability was checked through a pilot test with 50 students**.** The Academic Performance Questionnaire was adapted from The Modified Scale of Students' Opinions toward Research, developed by Amour et al., (2016) aligned with Bloom's (1956) Educational Objectives and Assessment framework**.** The researcher adopted and adapted relevant items to measure academic performance, study engagement, commitment, confidence, and academic goals. This questionnaire was also a part of the same structured survey to evaluate academic performance of students connected to virtual collaboration and engagement. To test the reliability, and fine tune the research instruments, a pilot study was performed on a sample of 50 randomly selected university students. Logistical problems were assessed and the reliability of the questionnaire was checked using Cronbach alpha and the overall score was high (.884).

Data collection procedures were designed and reliability of the data. Permission had been gathered from the appropriate departments to the involved higher educational institute before data gathering started. A random sampling method was used to pick University and Education University (public institutions), and Lahore University University of Management and Technology (private institutions).

4. Data Analysis

Data was analyzed using both of these statistical methodologies. Descriptive statistics, as well as standard deviations were used to summarize the data and provide an overview of the participants' responses. Statistical techniques, including the Pearson Product-Moment Correlation Coefficient, Independent Sample t-test, and ANOVA were used.

Table 1: Descriptive Statistics: Virtual Collaboration (N=500)

Factors	Mean	SD
Learning Environment	14.17	2.099
Learning Design	18.19	2.741
Learning Interaction	26.34	3.067
Overall Virtual Collaboration	58.70	5.697

Descriptive statistics for Virtual Collaboration, derived from 500 respondents, indicate that the Learning Environment scores vary between 7.00 to 19.00, with an average of 14.17 (SD = 2.099), indicating moderate consistency.

Table No 2: Student Engagement

Factors	Mean	SD
Valuing	11.78	2.221
Belonging	26.75	3.789
Cognitive Engagement	22.99	3.609
Peer Relationship	15.85	2.600
Relationship with Faculty	14.84	2.999
Behavior Engagement	14.71	3.211
Overall Student Engagement	110.75	13.888

Student Engagement is a sample-based result that is subdivided into six key factors, including Valuation, Sense of Belonging, Cognitive Engagement, Peers Relationships, Faculty Relationships, and Behavioral Engagement. Mean scores on overall student engagement are in a wide range of 71.00 to 134.00, with an average of 110.73 and standard deviation of 13.957, and the data are very diverse in terms of overall student engagement.

Table 3: Academic performance

Factors	Mean	SD
Study Engagement and commitment	26.67	3.677
Academic Confidence and Goals	19.07	2.849
Active Learning and Participation	11.90	1.642
Overall Student Engagement	57.61	6.543

The descriptive statistics of Academic Performance among the 500 respondents include Active Learning and Participation (M =11.90, SD = 1.642), Academic Confidence and Goals (M = 19.07, SD = 2.849), and Study Engagement and Commitment (M = 26.67, SD = 3.677).

Table No 4: Relationships: virtual collaboration skills and student engagement

Factors	Learning Env	Design	Interaction	Overall VC
Valuing	.267(**)	.194(**)	.275(**)	.163**
Belonging	.271(**)	.147(**)	.233(**)	.147*
Cognitive Engagement	.315(**)	.358(**)	.246(**)	.367**
Peer Relationship	.360(**)	.183(**)	.170(**)	.267**
Relationship with Faculty	.163(**)	.155(**)	.121(**)	.121**
Behavior Engagement	.267(**)	.247(**)	.247(**)	.267**
Overall Relationship				.394**

Correlation analysis demonstrates that there are significant positive relations between Virtual Collaboration and each of the dimensions of Student Engagement.

Table No 5 Correlations:

Correlation between online collaboration competency and academic achievement

Factors	Study Eng	Confidence and Goals	Active Learning	Overall AP
Learning Env	.167(**)	.163(**)	.176(**)	.209(**)
Design	.174(**)	.153(**)	. .098(*)	189(**)
Interaction	.116(**)	.053(**)	.997(*)	.088(**)
Overall	.208(**)	.162(**)	.112(*)	.216(**)
Study Engagement	.153(**)	.596(**)	.228(**)	.879(**)
Confidence and Goals	596(**)	.153(**)	345(**)	.857(**)
Active Learning	.228(**)	.345(**)	.153(**)	.530(**)
Overall Relationship	.879(**)	.857(**)	.530(**)	.492**

Find that all virtual collaboration factors, Learning Environment, Design, Interaction, and Overall Virtual Collaboration, are strongly and positively related to academic performance. There are positive correlations between Learning Environment and Overall Virtual Collaboration with Study Engagement, Academic Confidence and Goals, Active Learning and Participation, and Overall Academic Performance.

($p < .01$ or $p < .05$)

Table No 6: Regression Analysis: Factor-wise

Version	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	47.46	5.85	.421	8.105	.000
Learning env	1.792	.286	.270	6.265	.000
Learning design	.800	.220	157	6.633	.000
Interaction	.886	.191	.195	4.633	.000

a) Factors: (Constant), Interaction, Learning Environment, Design

b) Dependent Variable: Overall student engagement

The regression findings indicate that learning environment, learning design and interaction have a significant and positive impact on student engagement. It has been found that the learning environment has the highest influence (B = 1.792, Beta = .270) followed by the interaction (B = .886, Beta = .195) and learning design (B = .800, Beta =.157), and the p-values are less than.001. On the whole, these predictors account approximately 20 percent of the variance in student engagement (R 2 =.204) which means that other factors can also

contribute to student engagement, but the three factors are very important in improving student engagement.

Table No 7: Regression Analysis

Model	Sum of Square	df	Mean Square	f	Sig
Regression	19793.945	3	6597.982	42.269	.000(a)
Residual	77423.207	496	156.095		
Total	97217.152	496			

The table 4.6 of the regression results demonstrates that Interaction, Learning Environment and Learning Design have a significant effect on overall student engagement. The model is significant and the F-value is 42.269 and p =.000, which shows that the model fits well. The regression sum of square (19,793.945) and this residual sum of square (77,423.207) further help in strengthening the model.

5. Discussion & Conclusion

The results of this research can be useful to learn more about the skills in virtual collaboration of undergraduate students and their effects on engagement and academic performance. In general, the findings demonstrate that the virtual collaboration skills are well-received by the students which is indicated by a high level of awareness of their importance in enhancing the educational experiences and readiness to face the professional situations of the future. Effective communication, proficiency in technologies, and teamwork skills are accepted by students as the most relevant aspects of virtual working (Herriott, & McNulty, 2022). These findings have far-reaching implications on the educational stakeholders such as teachers, curriculum developers and policymakers (Thomas, Khan & Ahmad, 2022; Imran et al., 2023). It is necessary to include the skill of virtual collaboration in the school curriculum to train future employees to meet the requirements of their future jobs and globalized relationships and motivation (Reaves, 2019; Ahmad, Bibi, & Imran, 2023). To sum up, virtual collaboration skills play a vital role in supporting Student engagement and academic performance in higher education stressed by the present research. The participants of the study were university students who were requested to give their views about their virtual collaboration abilities, the level of engagement, and their academic performance (Dilshad, Shah, & Ahmad, 2023). The outcomes showed that the future perspective of virtual collaboration was mostly optimistic in terms of improving the educational standards (Shah, Ali & Ahmad, 2024). The students were found to have a positive perception and practice with regard to virtual collaboration skills. All in all, this study highlights the need to include virtual collaboration skills in the university curriculum in order to prepare students to meet future employment requirements (Ahmad, 2020). There should be specific interventions and non-discriminatory educational practices to fill the gaps of the development of skills in the different demographics.

5.1 Recommendations

The suggestions below are provided based on the findings of the study:

- Introduce specific training to improve virtual cooperation abilities in students with a focus on meeting gender-specific requirements.
- Incorporate the development of the virtual collaboration skills into the university curriculum so that all students are given a chance to develop their skills.
- Create the systems of constant control and assistance of virtual collaboration programs in order to make it efficient.
- Professional development opportunities should be offered to educators to equip them with Knowledge and expertise necessary to perform virtual collaboration.
- Provide optimal learning environment that encourages online student learning.
- Enhance engagement of the learner through the active internet sites and co-operative activities that comprise of virtual co-operation skills, which aim at enhancing student learning and academic performance at the university level.

6. References

Ahmad, T. (2020). Scenario based approach to re-imagining future of higher education which prepares students for the future of work. *Higher Education, Skills and Work-Based Learning*, *10*(1), 217-238.

Ahmad, N., Bibi, N., & Imran, M. (2023). Effects of Teacher's Motivation on Students' Academic Performance at Public Secondary Schools in Karachi Pakistan. *AITU Scientific Research Journal* , *1*(2), 20–32.

Ahmad, N., Noorani, Z., & Channa, N. (2025). Exploring the Role of Teachers in Promoting SDG 4: Quality Education and Lifelong Learning in the Classroom. *ACADEMIA International Journal for Social Sciences*, *4*(4), 3663–3676. https://doi.org/10.63056/ACAD.004.04.1216

Ahmad, N., Sewani, R., & Channa, N. (2025). Teachers Professional Development and its Effect on their Innovative Teaching Strategies. *Pakistan Social Sciences Review*, *9*(3), 141–156. https://doi.org/10.35484/pssr.2025(9-III)12

Ahmad, N., Sewani, R., & Fatima, H. (2025). School Heads as Instructional Leaders: Enhancing Educational Outcomes at Secondary Level. *Annual Methodological Archive Research Review*, *3*(4), 125-145. https://doi.org/10.63075/d54k3525

Ahmad, N., Sewani, R., & Khoso, F. J. (2024). Assessing Secondary School Teachers' Perceptions of Counseling and Guidance in Karachi, Pakistan. *Global Social Sciences Review, I*X(I), 134-144. https://doi.org/10.31703/gssr.2024(IX-I).12

Akram, M., Fatima, S. A., & Ahmad, N. (2024). Comparing Students' Science Motivation and their Achievement in Science Subjects at Secondary Level. *Global Social Sciences Review, IX*(II), 72-83. https://doi.org/10.31703/gssr.2024(IX-II).08

Armour, M., Dahlen, H. G., & Smith, C. A. (2016). More than needles: the importance of explanations and self-care advice in treating primary dysmenorrhea with acupuncture. *Evidence-Based Complementary and Alternative Medicine*, *2016*(1), 3467067.

Dilshad, S. A., Shah, R., & Ahmad, N. (2023). Implementation of Single National Curriculum at Primary Level: Problems And Practices In District Khushab. *Journal of Positive School Psychology*, *7*(4), 465–476.

Faheem, M., Gulab, F., & Ahmad, N. (2025). Teacher Educators' Perceptions and Practices for Keeping Mental Health in this Digital Era. *Journal of Management & Social Science, 2*(5), 92-107.

Günüç, S., & Kuzu, A. (2014). Factors influencing student engagement and the role of technology in student engagement in higher education: campus-class-technology theory. *Turkish Online Journal of Qualitative Inquiry*, *5*(4), 86-113.

Haider, K., Ahmad, N., & Ali, Z. (2024). Problems and challenges faced by non-Muslim students in achieving higher education at universities of Pakistan: An evaluative study. *Spry Contemporary Educational Practices*, *3*(1), 265–290. https://doi.org/10.62681/sprypublishers.scep/3/1/15

Herriott, H. L., & McNulty, M. A. (2022). Virtual learning impacts communication and teamwork. *The clinical teacher*, *19*(5), e13514.

Huri, A. S., Sahae, J. P., Prince, A. M., & Srivastava, R. (2024). Collaborative learning communities: Enhancing student engagement and academic achievement. *Educational Administration: Theory and Practice*, *30*(5), 7031-7036.

Imran, M., Ahmad, N., Al-Harthy, A. A. Q., & Jat, Z. G. (2023). Early Identification and Intervention: Amplifying the Voice of Slow Learners. *AITU Scientific Research Journal*, *1*(4), 17–25.

Jabeen, M., Ali, Z., & Ahmad, N. (2023). Factor Effecting on Quality Teaching Learning at Public Sector Schools in Karachi Pakistan. *Journal of Educational Research and Social Sciences Review (JERSSR)*, *3*(1), 92–98.

Johnson, D. W., & Johnson, R. T. (2013). Cooperation and the use of technology. In *Handbook of research on educational communications and technology* (pp. 777-803). Routledge.

Kahu, E. R. (2013). Framing student engagement in higher education. *Studies in higher education*, *38*(5), 758-773.

Kolachi, I. A., Shah, S. G. M., Ahmed, I., Ali, Z. & Ahmad, N. (2024). Factors Affecting English Language Teachers' Participation in Professional Development at Private Universities in Karachi, Pakistan. *Journal of Policy Research. 10(*2), 697–705. DOI: https://doi.org/10.61506/02.00287

Kumar, S. (2021). Consumer engagement in digital entertainment: A systematic review. *Digital Entertainment: The Next Evolution in Service Sector*, 1-22.

Lee, S., & Kim, B. (2024). The Effect of Collaborative Learning Service Quality on the Innovative Work Behavior of High-Tech Engineers. *Administrative Sciences*, *14*(12), 317.

Logan, J. W., Lundberg, O. H., Roth, L., & Walsh, K. R. (2017). The effect of individual motivation and cognitive ability on student performance outcomes in a distance education environment. *Journal of Learning in Higher Education*, *13*(1), 83-91.

Montag, C., Lachmann, B., Herrlich, M., & Zweig, K. (2019). Addictive features of social media/messenger platforms and freemium games against the background of psychological and economic theories. *International journal of environmental research and public health*, *16*(14), 2612.

Naeem, S., Ali, Z., & Ahmed, N. (2022). Evaluation of the Causes of Interest Decline in the Subject of Chemistry amongst Secondary and Higher Secondary School Students in Karachi Pakistan. *International Journal of Social Science & Entrepreneurship*, *2*(2), 175–184. https://doi.org/10.58661/ijsse.v2i2.48

Petare, P. A., Shamim, M., Gupta, T., Verma, R., & Singh, G. (2023). Exploring the impact of virtual learning environments on student engagement and academic achievement. *Journal of Survey in Fisheries Sciences*, *10*(1S), 5912-5923.

Pirzada, G., Tabassum, R., & Ahmad, N. (2024). WHY IS TVET NOT WORKING IN PRISONS? AN EXPLORATION OF PRISONS-BASED VOCATIONAL TEACHERS' PERSPECTIVES. *JOURNAL OF SOCIAL SCIENCES DEVELOPMENT*, *3*(3), 165–178. https://doi.org/10.53664/JSSD/03-03-2024-14-165-178

Reaves, J. (2019). 21st-century skills and the fourth industrial revolution: a critical future role for online education. *International Journal on Innovations in Online Education*, *3*(1).

Sears, D. A., & Reagin, J. M. (2013). Individual versus collaborative problem solving: Divergent outcomes depending on task complexity. *Instructional science*, *41*(6), 1153-1172.

Seddon, K., Skinner, N. C., & Postlethwaite, K. C. (2008). Creating a model to examine motivation for sustained engagement in online communities. *Education and Information Technologies*, *13*(1), 17-34.

Shah, S. G. M., Ali, Z., & Ahmad, N. (2024). Analytical study of Awareness of Metacognitive Reading Strategies and Reading Comprehension among College Students. *Voyage Journal of Educational Studies*, *4*(1), 34–46. https://doi.org/10.58622/vjes.v4i1.120

Simpson, N., & Froyd, J. (2008). Writing Learning Outcomes for Effective Assessment. *Mississippi University for Women*.

Thomas, M., Khan, A. H., & Ahmad, N. (2022). Way forward for post pandemic online teaching: A case of higher education in Pakistan. *Journal of Humanities, Social and Management Sciences (JHSMS)*, *3*(1), 1–15. https://doi.org/10.47264/idea.jhsms/3.1.1

Tucker-Drob, E. M. (2017). Motivational factors as mechanisms of gene-environment transactions in cognitive development and academic achievement. *Handbook of competence and motivation: Theory and application,*, 471-486.

Unal, E., & Cakir, H. (2021). The effect of technology-supported collaborative problem solving method on students' achievement and engagement. *Education and Information Technologies*, *26*(4), 4127-4150.

Zepke, N., & Leach, L. (2010). Improving student engagement: Ten proposals for action. *Active learning in higher education*, *11*(3), 167-177.