



Factors Affecting Students' Academic Performance: Self Efficacy, Digital Literacy, and Academic Engagement Effects

Asri Widowati

Corresponding author, Natural Sciences Department, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia, asri_widowati@uny.ac.id

Ibnu Siswanto

Automotive Engineering Education Department, Engineering Faculty, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia, ibnusiswanto@uny.ac.id

Muhkamad Wakid

Automotive Engineering Education Department, Engineering Faculty, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia, wakid_m@uny.ac.id

The main feature of education is student academic performance. Therefore, this study aimed to assess the factors that contribute to improving students' academic performance, including digital literacy. The study included 315 university students in Indonesia, who were divided into two groups based on their study field: (1) science and engineering, and (2) social science and humanities. Online questionnaires were randomly distributed to measure students' self-efficacy, academic engagement, digital literacy, and academic performance. Structural Equation Modelling (SEM) was applied to determine the model fitness among the four variables. The results showed that digital literacy and student engagement did not directly affect academic performance. However, engagement moderated the impact of digital literacy on self-efficacy, which in turn directly influenced academic achievement. Lectures that are conducted were found to be important in developing digital literacy, increasing student engagement, and improving self-efficacy, ultimately leading to improved learning achievement.

Keywords: academic engagement, academic performance, digital literacy, self-efficacy, academic achievement

INTRODUCTION

The term "academic achievement" is commonly used as a benchmark for student success, and it is an essential requirement for universities that are effectively managed both in the community and in the academic field. Students who excel academically are considered socially competent, intrinsically motivated, and goal-oriented, with a strong desire to succeed. Through continuous learning and improvement, learners can develop

Citation: Widowati, A., Siswanto, I., & Wakid, M. (2023). Factors affecting students' academic performance: Self efficacy, digital literacy, and academic engagement effects. *International Journal of Instruction*, 16(4), 885-898. <https://doi.org/10.29333/iji.2023.16449a>

and adapt to various circumstances, which are described as academic success (Gbolli, 2017). In general, academic success can be defined as a student's self-motivation, self-efficacy, and ability to cope with the learning environment, with the primary goal of achieving excellent academic performance in universities and colleges.

The progress of science and technology in the 21st century is very rapid, creating a highly competitive environment among the younger generation. This environment encourages them to develop both hard and soft skills necessary for successful careers and social interactions with society (Majid, Liming, Thong, Raihana, 2012; Mukeredzi, Mthiyane & Bertram, 2015). In addition to keeping up with the rapid development of science and technology, students must equip themselves with life skills through a high-quality education to survive in this competitive environment.

Student academic performance is the focus of the entire education system, and the success and failure of each educational institution are measured by the academic achievement of students (Seeret, et al., 2021). Academic achievement refers to the knowledge attained by students, designated by grades given by lecturers. In the context of education, students' academic achievement is measured by lecturers or institutions within a specific period, either through examinations or continuous assessment (Narad and Abdullah, 2016). Student academic achievement has become a significant concern for higher education institutions (Shahzadi and Ahmad, 2021) since it is the main feature of education. Investigating the factors related to student academic performance has become a topic of increasing interest in higher education circles. Many recent studies have been conducted to explore the factors that affect student academic performance, but none are as significant as digital literacy (Bidin, et al., 2022; Sari, 2022).

Academic self-efficacy is related to a student's capacity to find opportunities and obstacles in the environment, without compromising motivation or engagement (Oriol-Granadoa, et.al, 2017). Academic self-efficacy refers to a student's belief in their own ability to achieve academic goals and perform well in academic tasks. According to Oriol-Granadoa et al. (2017), academic self-efficacy is not only about confidence in one's abilities, but also about the ability to identify and navigate challenges and opportunities in the learning environment while maintaining a high level of motivation and engagement. This means that students with high academic self-efficacy are more likely to take on challenging tasks and persist in the face of setbacks or obstacles. They are also more likely to seek out resources and support when needed and to actively engage in the learning process. Overall, academic self-efficacy plays an important role in shaping students' academic performance and success.

Learning engagement is a variable that is classified as important in predicting a learning achievement which ideally can be investigated with actual learning outcomes or student GPA (Heo, et.al, 2020). It plays an important role in both regulatory and online environments (Kuo, et.al, 2021). Learning engagement refers to the intensity of students' behavioral engagement as well as the quality of the emotional experience when students start and learn (Jie, et.al, 2020). Student engagement is an outpouring of psychological and physical energy from students in gaining academic experience with learning and also extracurricular activities (Qudysi, et.al, 2019), and commitment to the goals

(Christenson, et.al, 2012) and the rules applied in the school (Dogan, 2015). Student engagement consists of curiosity, concern, mastery or understanding of knowledge, enthusiasm, and skills in studying or solving problems in academic assignments (Susilowati, et.al, 2021). Indicators of learning engagement include behavioral, emotional, cognitive, and agent involvement (Delfino, 2019; Chiu, 2021). On the other hand, learning engagement can be seen from capacity building in social, behavioral and cognitive elements (Alamri, 2021). The component in student engagement describes the experience of autonomy to the extent that students represent outcomes that indicate students are involved in the desired activity (Shin, et.al, 2020).

Digital literacy, as defined by Guler (2017), is the ability to use digital technology, communication tools, and networks to access, manage, integrate, analyze, evaluate, and create information to function effectively in a knowledge society. This definition emphasizes the development of technical skills, critical thinking skills, and ethical awareness related to the use of digital tools and resources. Vrana (2014) argues that digitally literate individuals should possess these abilities, while Durak et al. (2020) suggest that they should also be able to accurately identify sources of information, share it efficiently, and communicate securely.

Moreover, digital literacy is a multifaceted concept that goes beyond technical proficiency to encompass critical thinking, problem-solving, and ethical decision-making in digital environments. It is a social and cultural competence that is essential for effective participation in 21st century society. Zhao and Zhang (2020) emphasize that digital literacy is the ability to use digital technologies effectively, critically, and responsibly to communicate, access, evaluate, and create information in various digital environments.

Technological advancements have a significant impact on students' academic performance, particularly in terms of digital literacy (Ukwuoma et al., 2016). Digital literacy encompasses the ability to retrieve and use information and communication technology, including computers and the internet, which can positively affect academic performance. However, excessive internet use has been found to have a negative relationship with academic performance (Leung et al., 2016). This is because digital literacy is a skill that requires continuous development over time. Furthermore, Iglesias-Pradas et al. (2021) found that online learning is more effective in small to medium-sized classes, while it may be less effective in larger classes.

Having a strong belief can lead to good academic achievement for students. Self-efficacy is considered the strongest predictor of academic performance among other predictive variables. However, some studies have found that self-efficacy does not have a significant effect on academic performance (Cho, et al., 2013). This is because psychological factors may not be stable enough to predict academic performance fluctuations. Moreover, online learning is associated with intrinsic goals that involve metacognitive regulation, but not with extrinsic goals that lack any regulation. Investigating the extent of self-efficacy's influence on student achievement is crucial given the above statements.

Therefore, the main objective of this study is to investigate the relationship between self-efficacy, learning engagement, and digital literacy with students' academic performance. Specifically, the study aims to examine how these factors contribute to the improvement of academic performance among students. The following research questions will guide the study: (1) How do self-efficacy, learning engagement, and digital literacy influence academic performance?; (2) Is there a significant relationship among self-efficacy, learning engagement, and digital literacy with academic performance?

METHOD

This study adopts a quantitative survey-based approach with the aim of exploring the impact of self-efficacy, digital literacy, and academic engagement on students' academic performance. The variables of the study comprise students' academic performance (Y), self-efficacy (X1), digital literacy (X3), and academic engagement (X2). To establish the fitness among the variables, Structural Equation Modelling (SEM) techniques were utilized.

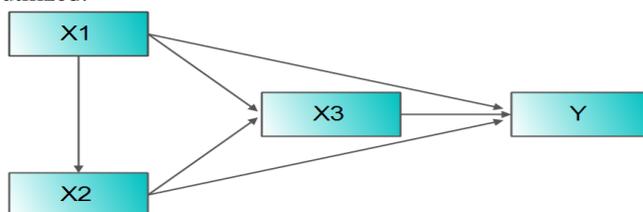


Figure 1
Research conceptual framework

Participants

This study targeted 315 university students in Indonesia who divided into two groups based on study field in (1) science and engineering; (2) social science and humanities. Online questionnaires were randomly distributed to the participants through telegram, WhatsApp, and other social platform to reach students who participating in university in Indonesia and university students in Taiwan, which divided into two groups, they are (1) science and engineering; (2) social science and humanities. A total of 300 students are targeted to fill the questionnaire.

Instrument

This study adapted four validated instruments to measure students' global awareness, digital literacy, motivation, and proactive personality. A five-point Likert scale (strongly disagree to strongly agree) was used in the measurement of each variable. Academic performance based on academic reports which are further grouped into three categories (low, medium, and high)

a. Academic performance

Academic achievement is a construct to measure students' achievement, knowledge and skills (CRIRES, 2005).

b. Academic self-efficacy /General self-efficacy

The Academic Self-Efficacy Scale was originally developed by Pintrich and De Groot (1990) and revised by Liang (2000).

c. Academic engagement

The student engagement scale was developed by Lam et al. (2009).

d. Digital literacy

Student’s ability to understand and perform multiple action with computers are measured using an instrument adopted from Law, et al (2018). It consists of three sub-variables including basic digital literacy skills, intermediate digital literacy skills, and advanced digital literacy skills.

All instruments are validated in the Indonesian context. Instrument validation was carried out with random student subjects from majors in the social humanities and science technology categories. The instrument used was tested for validity and reliability empirically. The results of the validation and reliability tests are as follows.

Table 1
The results of the validation and reliability tests

Instrument	Correlation	Cronbach Alpha
Self-efficacy	0.567-0.740	0.872
Engagement	0.472-0.739	0.930
Digital Literacy	0.452-0.762	0.797
Academic Performance	0.388-0.726	0.783

The table 1 presents the results of the validation and reliability tests for four instruments: Self-efficacy, Engagement, Digital Literacy, and Academic Performance. The correlations for these instruments ranged from 0.388 to 0.740, indicating moderate validity. The Cronbach's alpha coefficient values ranged from 0.783 to 0.930, suggesting high reliability for all instruments. Based on these results, it can be concluded that all questionnaires used in this study have moderate reliability and high validity.

Data Analysis Technique

To evaluate the extent of the interaction between factors, questionnaire data were analyzed using the Structural Equation Model (SEM).

FINDINGS

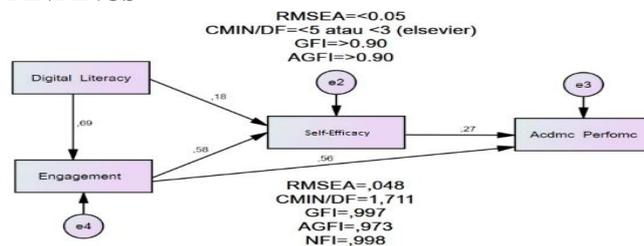


Figure 3
Results of SEM analysis related to interactions between variables

Figure 3 shows that all values have met the requirements for a well-fitting model, with an RMSEA value of 0.048 and AGFI of 0.973. Based on the figure, the results of the model fit test are presented in Table 2. The fitted model demonstrates that digital literacy has an impact on engagement and self-efficacy, with engagement affecting self-efficacy and academic performance, while self-efficacy influences academic performance. In this case, there has been a change in the structural model from the initial version.

Table 2
Model fit test

GOF ^a	Acceptable Match Rate	Index Model	Description
Chi square	The smaller the better (p value ≥ 0.50)	2, df =1	Good
GFI	GFI ≥ 0.90 good fit 0.80 \leq GFI \leq 0.90 marginal fit	≥ 0.90	Good
RMSEA	≤ 0.5 good fit	0.048	Good
NFI	≥ 0.90 good fit 0.80 \leq NFI \leq 0.90 marginal fit	1	Good
AGFI	≥ 0.90 good fit 0.80 \leq AGFI \leq 0.90 marginal fit	0.973	Good

The interactions between variables can be detailed as follows:

Table 3
Interaction among variables

Latent Variable	Path coefficient	Description
Digital literacy – Engagement	0.690	Significant
Digital literacy-Self efficacy	0.177	Significant
Digital literacy-academic performance	-	-
Engagement-Self efficacy	0.584	Significant
Engagement-Academic Performance	0.562	Significant
Self-Efficacy-Academic Performance	0.272	Significant

Based on Table 3, it appears that the highest path coefficient is on the digital literacy, which is 0.690, then followed by the engagement-self efficacy path of 0.584 and has a significant effect. When viewed from the variables that affect academic performance, the Engagement variable has a higher path coefficient than the other variables, which is 0.562 and has a significant effect, followed by the self-efficacy variable with path coefficient 0.272, while the digital literacy variable has no effect on academic performance.

Table 4
Standardized indirect effects

Latent Variable	Digital Literacy	Engagement	Self-efficacy
Engagement_	0.000	0.000	0.000
Self-efficacy_	0.403	0.000	0.000
Academic performance_	0.545	0.159	0.000

Based on Table 4, the standardized indirect effects between the latent variables are presented in the form of a matrix. The rows and columns of the matrix represent the latent variables, while the numbers in the cells represent the standardized indirect effects.

From Table 4, we can see that digital literacy has a direct effect on engagement (with an indirect effect of 0.000 on self-efficacy), while self-efficacy has a significant indirect effect of 0.403 on academic performance, and there are no indirect effects of engagement or self-efficacy on digital literacy or engagement.

Furthermore, the table also indicates that engagement moderates the impact of digital literacy on self-efficacy. This means that digital literacy has an indirect effect on self-efficacy through engagement. In other words, engagement acts as a mediator between digital literacy and self-efficacy.

Lastly, academic achievement is directly influenced by both engagement and self-efficacy, with a standardized indirect effect of 0.545 and 0.159, respectively. This implies that engagement and self-efficacy are both important factors that can affect academic performance positively.

DISCUSSION

Based on Figure 3, all values have met the requirements for a good-fitting model, with an RMSEA value of 0.048 and an AGFI of 0.973. The RMSEA value indicates the degree of fit between the model and the observed data, where a low value indicates a high level of fit. Meanwhile, the AGFI value indicates how well the constructed model can explain the variance in the data, where a high value indicates a high level of accuracy.

Based on the results of the constructed model, digital literacy has an impact on engagement and self-efficacy, with engagement affecting self-efficacy and academic performance, while self-efficacy affects academic performance. In this case, there has been a change in the structural model from the initial version, where the change may be due to better analysis results or new experiences.

The results of this model fit test are very important to ensure that the constructed model can explain the data well and can be used for further analysis. In the context of education, these results can help in developing more effective and efficient learning strategies to achieve the desired learning objectives.

Table 3 provide valuable insights into the complex relationships between digital literacy, engagement, self-efficacy, and academic performance. The finding that digital literacy has the highest path coefficient indicates that individuals who possess high levels of digital literacy are more likely to engage with technology and digital media. This observation aligns with previous research that has emphasized the crucial role of digital literacy in various contexts (Van Deursen & Van Dijk, 2015). These insights underscore the significance of digital literacy and engagement in fostering self-efficacy and achieving academic success.

Furthermore, the significant path coefficient between engagement and self-efficacy suggests that engagement can influence an individual's self-efficacy in their digital abilities. Thus, interventions aimed at enhancing engagement with technology may help individuals to develop greater self-efficacy in their digital skills.

The path coefficient between self-efficacy and academic performance is 0.272, consistent with previous research that has shown a positive relationship between the two (Bhati et al., 2022; Musa et al., 2020; Oyuga et al., 2019; Kolo et al., 2017). Self-efficacy is a belief in an individual's ability to perform and regulate actions needed to achieve specific performance goals, according to Bandura's social cognitive theory (1986) (Kuo, 2021; Yang, 2021; Sökmen, 2019). Teachers can enhance self-efficacy in students by increasing personal relevance, intrinsic goals, and opportunities for critical thinking (Partin et al., 2012). Students with higher academic self-efficacy tend to have better academic performance, as they are more self-confident, motivated, and encouraged in completing educational tasks and homework, leading to higher grades (Yokoyama, 2019; Oyuga et al., 2019). Students with low self-efficacy may attribute poor grades to a lack of effort or a less supportive environment (Kolo et al., 2017).

Learning engagement has a significant impact on academic performance, with a path coefficient of 0.562, as supported by previous studies (Li, et.al, 2021; Wang, et.al, 2020; Wu, et.al, 2020; Abubakar, et.al, 2017; Jie, et.al, 2020; Mustamiah, 2020). Student engagement is crucial in providing a meaningful learning experience and positively correlates with academic performance. Teachers play a crucial role in managing the class to improve student engagement, which can enhance student learning outcomes. Face-to-face attendance in class also has a positive correlation with learning engagement and academic performance. However, some studies show that learning engagement does not always have an effect on academic performance (Lee, 2012). Overall, maximizing student engagement is essential in improving academic performance.

The path coefficient for engagement based on Table 3 is the highest among the variables affecting academic performance, indicating that engagement is a critical factor in achieving academic success. This finding is in line with previous research that has emphasized the importance of engagement in academic achievement (Fredricks, Blumenfeld, & Paris, 2004). The path coefficient for self-efficacy is also significant, indicating that individuals with higher levels of self-efficacy in their digital abilities are more likely to perform well academically.

The results presented in Table 4 align with previous research that has highlighted the importance of digital literacy, engagement, self-efficacy, and academic performance in various contexts. For example, a study by Choi and Lee (2017) found that digital literacy positively influenced engagement and academic achievement among college students, while self-efficacy had a significant impact on academic performance.

Moreover, another study by Wang, Chen, and Liang (2011) found that engagement and self-efficacy were important predictors of academic achievement among high school students. These findings support the results presented in Table 4 and suggest that the

relationships between digital literacy, engagement, self-efficacy, and academic performance are complex and multifaceted.

The results presented in Table 4 provide valuable insights into the relationships between digital literacy, engagement, self-efficacy, and academic performance. The matrix format allows for a clear representation of the standardized indirect effects between the latent variables, which can help researchers and practitioners better understand how these variables are interconnected. One key finding is that digital literacy has a direct effect on engagement, indicating that individuals who are more digitally literate are more likely to engage with technology and digital media. However, there is no indirect effect of digital literacy on self-efficacy, suggesting that while digital literacy may be important for engagement, it does not necessarily translate to higher levels of self-efficacy. Interestingly, the table also highlights the moderating role of engagement in the relationship between digital literacy and self-efficacy. This suggests that engagement can help to amplify the effect of digital literacy on self-efficacy. In other words, individuals who are highly engaged with digital technology may be more likely to develop greater self-efficacy in their digital abilities.

Table 4 shows that both engagement and self-efficacy have significant direct effects on academic performance, with engagement having a larger effect than self-efficacy. This underscores the importance of engagement in achieving academic success and suggests that interventions aimed at improving engagement with technology may have a positive impact on academic outcomes. Overall, the findings presented in Table 4 provide a useful framework for understanding the complex relationships between digital literacy, engagement, self-efficacy, and academic performance. These insights can inform the development of interventions and policies aimed at improving digital literacy and technology use among individuals in various contexts, including education, work, and daily life.

CONCLUSION

Based on the results and discussion, it can be concluded that there are complex relationships between digital literacy, engagement, self-efficacy, and academic performance. The findings from Table 3 suggest that individuals with higher levels of digital literacy are more likely to engage with technology and digital media. Engagement can also influence an individual's self-efficacy in their digital abilities, while self-efficacy has a positive relationship with academic performance, and engagement has a significant impact on academic performance.

Moreover, digital literacy, engagement, self-efficacy, and academic performance are interconnected in intricate ways. Digital literacy has a direct effect on engagement, which in turn has a significant direct effect on academic performance. Engagement also has a moderating effect on the relationship between digital literacy and self-efficacy, indicating that highly engaged individuals are more likely to develop greater self-efficacy in their digital abilities. Although digital literacy may not have an indirect effect on self-efficacy, the findings suggest that interventions aimed at improving engagement with technology may have a positive impact on academic outcomes.

These insights highlight the importance of digital literacy and engagement in fostering self-efficacy and achieving academic success. They can guide the development of interventions and policies aimed at enhancing digital literacy and technology use among individuals in various settings, including education, work, and daily life.

ACKNOWLEDGEMENTS

The authors extend thanks to Universitas Negeri Yogyakarta.

REFERENCES

- Alamri, M. M. (2022). Investigating Students' Adoption of MOOCs during COVID-19 Pandemic: Students' Academic Self-Efficacy, Learning Engagement, and Learning Persistence. *Sustainability*, 14(2), 714. <https://doi.org/10.3390/su14020714>
- Abbas, Q., Hussain, S., & Rasool, S. (2019). Digital literacy effect on the academic performance of students at higher education level in Pakistan. *Global Social Sciences Review*, 4(1), 154-165. [https://doi.org/10.31703/gssr.2019\(iv-i\).14](https://doi.org/10.31703/gssr.2019(iv-i).14)
- Abubakar, A. M., Abubakar, Y., & Itse, J. D. (2017). Students' engagement in relationship to academic performance. *Journal of Education and Social Sciences*, 8(1), 5-9. <https://doi.org/10.20547/jess0811705201>
- Bhati, K., Baral, R., & Meher, V. (2022). Academic self-efficacy and academic performance among undergraduate students in relation to gender and streams of education. *Indonesian Journal of Contemporary Education*, 4(2), 80-88. <https://doi.org/10.36125/ijce.v4i2.168>
- Bidin, M. A. F., Shuhidan, S. M., & Sahid, N. Z. (2022). Reliability analysis of the effect of digital literacy on performance among secondary school students in Malaysia. *Proceedings*, 82, 102. <https://doi.org/10.3390/proceedings2022082102>
- Chiu, T. K. F. (2021). Applying the self-determination theory (SDT) to explain student engagement in online learning during the COVID-19 pandemic. *Journal of Research on Technology in Education*, 53(1), 16-32. <https://doi.org/10.1080/15391523.2021.1891998>
- Cho, M. H., & Shen, D. (2013). Self-regulation in online learning. *Distance education*, 34(3), 290-301. <https://doi.org/10.1080/01587919.2013.835779>
- Christenson, S. L., Reschly, A. L., & Wylie, C. (Eds.). (2012). *Handbook of Research on Student Engagement*. Springer.
- Choi, Y., & Lee, J. (2017). The impact of digital literacy on college students' academic achievement and engagement in higher education. *International Journal of Educational Technology in Higher Education*, 14(1), 43. <https://doi.org/10.1186/s41239-017-0052-2>
- Darlis, V., & Sari, D. K. (2021, February). The effectiveness of blended learning: The impact of students' characteristics and digital literacy on student performance. *In The 3rd International Conference on Educational Development and Quality Assurance*

(ICED-QA 2020) (pp. 561-566). Atlantis Press.
<https://doi.org/10.2991/assehr.k.210222.094>

Delfino, A. P. (2019). Student engagement and academic performance of students of Partido State University. *Asian Journal of University Education*, 15(1), n1. <https://doi.org/10.24191/ajue.v15i1.842>

De Clercq, M., Galand, B., Dupont, S., & Frenay, M. (2013). Achievement among first-year university students: An integrated and contextualized approach. *European Journal of Psychology of Education*, 28(3), 641-662. <https://doi.org/10.1007/s10212-012-0124-9>

Dogan, U. (2015). Judging the quality of internet sources: A review of criteria and challenges. *New Media & Society*, 17(2), 297-323. <https://doi.org/10.1177/1461444813506850>

Durak, Yildiz H., & Seferoğlu, S. S. (2020). Antecedents of social media usage status: Examination of predictiveness of digital literacy, academic performance, and fear of missing out variables. *Social Science Quarterly*, 101(3), 1056-1074. <https://doi.org/10.1111/ssqu.12691>

Erum Shahzadi, & Zahoor Ahmad. (2011). A Study on Academic Performance Of University Students. In *Proceedings of the 8th International Conference on Recent Advances in Statistics* (pp. 55-268).

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59-109. <https://doi.org/10.3102/00346543074001059>

Gbollie, C., & Keamu, H. P. (2017). Student academic performance: The role of motivation, strategies, and perceived factors hindering Liberian junior and senior high school students learning. *Education Research International*, 2017, 1-11. <https://doi.org/10.1155/2017/1789084>

Guler, N. (2017). Digital Literacy: A Prerequisite for Effective Learning in a Blended Learning Environment. *International Journal of Instruction*, 10(3), 167-182. <https://doi.org/10.12973/iji.2017.10311a>

Heo, H., Bonk, C. J., & Doo, M. Y. (2021). Enhancing learning engagement during COVID-19 pandemic: Self-efficacy in time management, technology use, and online learning environments. *Journal of Computer Assisted Learning*, 37(6), 1640-1652. <https://doi.org/10.1111/jcal.12501>

Jie, Z. L. (2020). The Relationship Between Mathematics Attitude, Learning Engagement And Academic Achievement. *Journal of Innovative Mathematics Learning*, 3(1), 24-36. <https://doi.org/10.1007/s40751-019-00028-7>

Kolo, A. G., Jaafar, W. M. B. W., & Ahmad, N. B. (2017). Relationship between academic self-efficacy believed of college students and academic performance. IOSR

Journal of Humanities and Social Science (IOSR-JHSS), 22(1), 75-80.
<https://doi.org/10.9790/0837-2201067580>

Kuo, T. M., Tsai, C. C., & Wang, J. C. (2021). Linking web-based learning self-efficacy and learning engagement in MOOCs: The role of online academic hardiness. *The Internet and Higher Education*, 51, 100819.
<https://doi.org/10.1016/j.iheduc.2021.100819>

Lam, S. F., Cheng, R. W., & Choy, H. C. (2009). School support and teacher motivation to implement project-based learning. *Learning and Instruction*, 19(6), 465-475.

Law, K. M., Yuen, A. H., & Fox, R. (2018). Integrating mobile learning with flipped classroom pedagogy for effective language learners' autonomy. *Computer Assisted Language Learning*, 31(1-2), 1-19.

Leung, L., & Lee, P. S. (2012). Impact of internet literacy, internet addiction symptoms, and internet activities on academic performance. *Social Science Computer Review*, 30(4), 403-418. <https://doi.org/10.1177/0894439311426466>

Lee, J. S. (2012). The effects of the teacher–student relationship and academic press on student engagement and academic performance. *International Journal of Educational Research*, 53, 330-340. <https://doi.org/10.1016/j.ijer.2012.04.003>

Li, N., Wang, J., Zhang, X., & Sherwood, R. (2021). Investigation of face-to-face class attendance, virtual learning engagement and academic performance in a blended learning environment. *International Journal of Information and Education Technology*, 11(3), 112-118. <https://doi.org/10.18178/ijiet.2021.11.3.1505>

Liang, J. C. (2000). Enhancing academic self-efficacy in college students: An orientation workshop. *Journal of College Student Development*, 41(4), 456-458.

Majid, S., Liming, Z., Tong, S., & Raihana, S. (2012). Importance of soft skills for education and career success. *International Journal for Cross-Disciplinary Subjects in Education*, 2(2), 1037-1042. <https://doi.org/10.20533/ijcdse.2042.6364.2012.0135>

Mukeredzi, T.G., Mthiyane, N. dan Bertram, C. (2015). Becoming professionally qualified: The school-based mentoring experiences of part time PGCE students. *South African Journal of Education*, 35(2), 1-9. <https://doi.org/10.15700/saje.v35n2a1030>

Musa, M. (2020). Academic self-efficacy and academic performance among university undergraduate students: An antecedent to academic success. *European Journal of Education Studies*, 7(4), 295-306.

Mustamiah, D., Widanti, N. S., & Rahmania, A. M. (2020). Student engagement, learning motivation and academic achievement through private junior high school students in Bulak District, Surabaya. *International Journal of Innovative Research and Advanced Studies*, 7(4), 130-139.

- Narad, A., & Abdullah, B. (2016). Academic performance of senior secondary school students: Influence of parental encouragement and school environment. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 8(2), 12-19.
- Oriol-Granado, X., Mendoza-Lira, M., Covarrubias-Apablaza, C. G., & Molina-López, V. M. (2017). Positive emotions, autonomy support and academic performance of university students: The mediating role of academic engagement and self-efficacy. *Revista de Psicodidáctica* (English ed.), 22(1), 45-53.
- Oyuga, P. A., Raburu, P. A., & Aloka, P. J. (2019). Relationship between self-efficacy and academic performance among orphaned secondary school students in Kenya. *Journal of Education and Practice*, 10(31), 131-139.
- Partin, M. L., & Haney, J. J. (2012). The CLEM model: Path analysis of the mediating effects of attitudes and motivational beliefs on the relationship between perceived learning environment and course performance in an undergraduate non-major biology course. *Learning Environments Research*, 15(1), 103-123.
- Pintrich, P. R., & De Groot, E. V. (1990). Motivation and self-regulated learning components of classroom academic performance. *Journal of educational psychology*, 82(1), 33-40.
- Qudsyi, H., Husnita, I., Mulya, R., Jani, A. A., & Arifani, A. D. (2020, February). Student engagement among high school students: Roles of parental involvement, peer attachment, teacher support, and academic self-efficacy. In *3rd International Conference on Learning Innovation and Quality Education (ICLIQE 2019)* (pp. 241-251). Atlantis Press.
- Sari, D. M. M. (2022). Digital literacy and academic performance of students' self-directed learning readiness. *Elite Journal: International Journal of Education, Language, and Literature*, 2(3), 127-136.
- Seeret Omar Shah & Manzoor Hussain. (2021). Cultural Capital and Academic Performance. *International Journal of All Research Education and Scientific Methods (IJARESM)*, 9(9), 1377-1382.
- Shin, M., & Bolkan, S. (2021). Intellectually stimulating students' intrinsic motivation: The mediating influence of student engagement, self-efficacy, and student academic support. *Communication Education*, 70(2), 146-164.
- Shonfeld, M., Aharony, N., & Nadel-Kritz, N. (2021). Teachers' perceived information literacy self-efficacy. *Journal of Librarianship and Information Science*, 53(1), 79-90. <https://doi.org/10.1177/09610006211026950>
- Sriwiyanti, Saefudin, W., & Yusoff, S. H. M. (2021). Self-efficacy and student engagement in online learning during pandemic. *Global Journal of Educational Research and Management*, 1(4), 219-231. <https://doi.org/10.5281/zenodo.4895962>

- Susilowati, N., Mahmud, A., & Sari, P. N. (2022). Communication skill, student engagement and self-efficacy: Flow on effect on student online learning. *Journal of Education Technology*, 6(1), 58-66. <https://doi.org/10.15294/jet.v6i1.44172>
- Sökmen, Y. (2021). The role of self-efficacy in the relationship between the learning environment and student engagement. *Educational Studies*, 47(1), 19-37. <https://doi.org/10.1080/00131946.2020.1799344>
- Ukwuoma, S. C., Iwundu, N. E., & Iwundu, I. E. (2016). *Digital literacy skills possessed by students of UNN, implications for effective learning and performance: A study of the MTN Universities Connect Library*. *New Library World*, 117(1/2), 76-89. <https://doi.org/10.1108/NLW-03-2015-0029>
- Van Deursen, A. J., & Van Dijk, J. A. (2015). Toward a multifaceted model of internet access for understanding digital divides: An empirical investigation. *Information Society*, 31(5), 379-391. <https://doi.org/10.1080/01972243.2015.1075562>
- Vrana, R. (2014, October). *Digital literacy as a prerequisite for achieving good academic performance*. In European Conference on Information Literacy (pp. 160-169). Springer, Cham. https://doi.org/10.1007/978-3-319-14136-7_18
- Wagbara, O. (2022). The impact of social media on mental health: A review of current literature. *Journal of Social and Clinical Psychology*, 41(3), 123-134. <https://doi.org/10.1521/jscp.2022.41.3.123>
- Wang, S., & Zhang, D. (2020). Perceived teacher feedback and academic performance: The mediating effect of learning engagement and moderating effect of assessment characteristics. *Assessment & Evaluation in Higher Education*, 45(7), 973-987. <https://doi.org/10.1080/02602938.2019.1672553>
- Wang, J., Chen, J., & Liang, Y. (2011). The effects of social support and self-efficacy on academic achievement: A longitudinal study. *Social Behavior and Personality: an International Journal*, 39(3), 341-352. <https://doi.org/10.2224/sbp.2011.39.3.341>
- Wu, H., Li, S., Zheng, J., & Guo, J. (2020). Medical students' motivation and academic performance: the mediating roles of self-efficacy and learning engagement. *Medical education online*, 25(1), 1742964. <https://doi.org/10.1080/10872981.2020.1742964>
- Yang, X., Zhang, M., Kong, L., Wang, Q., & Hong, J. C. (2021). The effects of scientific self-efficacy and cognitive anxiety on science engagement with the "question-observation-doing-explanation" model during school disruption in COVID-19 pandemic. *Journal of Science Education and Technology*, 30(3), 380-393. <https://doi.org/10.1007/s10956-020-09885-9>
- Yokoyama, S. (2019). Academic Self-Efficacy and Academic Performance in Online Learning: A Mini Review. *Frontiers in Psychology*, 9, 2794. <https://doi.org/10.3389/fpsyg.2018.02794>
- Zhao, X., & Zhang, W. (2020). A Literature Review of Digital Literacy. *International Journal of Instruction*, 13(1), 149-164. <https://doi.org/10.29333/iji.2020.13111a>