

Technology Readiness and Psychological Correlate with Academic Achievement of Elite Student-Athletes at the College Level?

¿La preparación tecnológica y la psicología se correlacionan con el rendimiento académico de los estudiantes-atletas de élite a nivel universitario?

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Abstract. After the COVID-19 period, academic achievement among elite student-athletes has not shown any improvement and it is not yet known exactly the main factors that contributed to academic achievement. In addition, limited evidence in previous research that analyzed the relationship between technological and psychological readiness with academic achievement among elite student athletes at the college level became a gap in this study. Therefore, this study investigated the relationship between technological and psychological readiness variables and academic achievement. Correlational research was adopted in this study which involved eighty-five elite first-year student-athletes from the Universitas Negeri Surabaya (Indonesia). Technological and psychological readiness was measured using a questionnaire while academic achievement was measured by filling out questions about soccer, basketball and volleyball. Spearman's rank was used to investigate the relationship of each variable. We observed several findings in this study. First, there was a relationship between the variable technological readiness and academic achievement. Second, there was a psychological relationship between academic achievement. Third, there was relationship between technological and psychological readiness and academic achievement. Thus, we highlight that the level of academic achievement among elite student athletes in the first year was closely related to technological and psychological readiness.

Keywords: Technological, Psychological, Academic Achievement, Elite Student-Athletes

Resumen. Después del período COVID-19, el rendimiento académico entre los estudiantes-atletas de élite no ha mostrado ninguna mejora y aún no se conoce exactamente los principales factores que contribuyeron al rendimiento académico. Además, la evidencia limitada en investigaciones previas que analizaron la relación entre la preparación tecnológica y psicológica con el rendimiento académico entre estudiantes atletas de élite a nivel universitario se convirtió en un vacío en este estudio. Por lo tanto, este estudio investigó la relación entre las variables de preparación tecnológica y psicológica y el rendimiento académico. En este estudio se adoptó una investigación correlacional en la que participaron ochenta y cinco estudiantes-atletas de élite de primer año de la Universitas Negeri Surabaya (Indonesia). La preparación tecnológica y psicológica se midió mediante un cuestionario, mientras que el rendimiento académico se midió respondiendo preguntas sobre fútbol, baloncesto y voleibol. Se utilizó el rango de Spearman para investigar la relación de cada variable. Observamos varios hallazgos en este estudio. Primero, hubo una relación entre la variable preparación tecnológica y el rendimiento académico. En segundo lugar, había una relación psicológica entre el rendimiento académico. En tercer lugar, hubo una relación entre la preparación tecnológica y psicológica y el rendimiento académico. Así, destacamos que el nivel de rendimiento académico entre los estudiantes deportistas de élite en el primer año estuvo estrechamente relacionado con la preparación tecnológica y psicológica.

Palabras clave: Tecnológico, Psicológico, Rendimiento Académico, Estudiantes-Deportistas de Élite

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Introduction

The physical education programmes in several countries have experienced significant transformations due to the global impact of the COVID-19 pandemic (Fang, Teng & Wang, 2021; López-Valenciano, Suárez-Iglesias, Sanchez-Lastra & Ayán, 2021; Mendes, Fachada, Melo, Campos, Nobre & Machado-Rodrigues, 2023; Mujriah et al., 2022). Prior to the onset of the COVID-19 pandemic, the predominant mode of instruction within the university setting involved in-person interactions. However, in response to the pandemic, there was a swift transition to an online learning paradigm (Jumareng et al., 2021; Fierro et al., 2022). According to Butt, Mahmood & Saleem, (2022), empirical evidence has substantiated that online learning throughout the epidemic fostered more inventive and innovative learning environments compared to face-to-face

instruction. One potential rationale is that elite student-athletes have the ability to conveniently and expeditiously obtain and fulfil several advantages associated with online physical education training, such as the acquisition of knowledge (Prasetyanto, Rizki & Sunitiyoso, 2022). However, prior research has yielded conflicting results about the impact of online physical education classes, with some studies highlighting negative consequences such as unreliable internet connections and expensive data limitations (Jumareng et al., 2022). Furthermore, it should be noted that the advent of online learning has had a significant impact on individuals' psychological well-being, as evidenced by previous research (Rahman, Hamka & Lin, 2020; Teresa, Guss & Boyd, 2021; Ahmad, Ismail & Husain, 2022). This, in turn, has been found to have an indirect effect on elite students' academic achievement, leading to a steady deterioration (Hashemi, 2021; Yuda et al., 2022).

Academic achievement is a crucial element that necessitates the accomplishment of all elite student-athletes within the university setting (Abdullah, Shamsi, Jenatabadi, Ng & Mentri, 2022). The academic achievement of elite student-athletes can be assessed using a parameter that indicates their level of success or failure (Moore, 2019). Zanevsky & Zanevska (2021) claim that there exists a positive correlation between exceptional academic achievement and proficiency in athletics among elite student-athletes. According to Tentama & Abdillah (2019), prior research has indicated that achieving good academic achievement might enhance elite student-athletes employability prospects, while a lack thereof may provide challenges in securing employment. Moreover, Yuda et al. (2022), found that those with lower academic achievement may experience prolonged periods of unemployment. According to Fokkens-Bruinsma, Vermue, Deinum & van Rooij (2021), the primary determinant of student-athletes success both in the present and in the long term is their academic achievement. Various aspects have been purported or hypothesised to serve as indicators of academic achievement, specifically, the readiness of technology and the psychological well-being of elite student-athletes.

Technology readiness was identified as the initial component for predicting elite student-athletes academic achievement (Wang, Xia, Guo, Xu & Zhao, 2022). The concept of technology readiness has been construed by certain scholars as an individual's preparedness, consciousness, disposition, engagement, or inclination to use technology within domestic, professional, or educational settings (Blut & Wang, 2020; Andarwulan, Al Fajri & Damayanti, 2021). According to the research conducted by Warden, Yi-Shun, Stanworth & Chen (2022), the concept of technological preparedness encompasses a positive aspect. Specifically, optimism is characterised as a favourable perception of technology, while innovativeness refers to the proficiency in utilising novel technical advancements to foster innovation. The negative dimension referred to as discomfort is characterised by an individual's unwillingness or reluctance to engage with technology. Insecurity, on the other hand, is defined as a lack of trust or confidence in technology (Mukerjee, Deshmukh & Prasad, 2019). According to Geng, Law & Niu (2019), a study indicated that there has been a rise in research on technology readiness in education due to the assertion that it may effectively facilitate learning objectives. The awareness and active engagement of elite student-athletes in learning technology within the context of physical education is significantly influenced by the level of technology readiness. This readiness encompasses the familiarity and proficiency with various technological tools such as laptops, computers (Yosser, Idrus & Ali, 2020), as well as internet platforms like zoom meetings, google meet, and google classroom (Jumareng et al., 2021). Prior research has elucidated the manifold advantages of technology readiness. For instance, it fosters enhanced

literacy among elite student-athletes, instills a sense of comfort in utilising technology, and facilitates their engagement in the learning process. Conversely, a lack of readiness among elite student-athletes poses obstacles to their involvement and presents challenges in effectively utilising technology (Chang, Yu, Chao & Lin, 2020). The findings of a recent study indicate a deficiency in the preparedness for technology use. Indeed, it is observed that a significant number of elite student-athletes in India lack proficiency in digital technology skills, resulting in a decline in their academic achievement (Wang, Xia, Guo, Xu & Zhao, 2022).

Psychological well-being was the second factor estimated to predict elite student-athletes academic achievement. Psychological well-being was conceptualised as the ability to develop potential independently and determine life goals in a more positive direction (Muqodas et al., 2020; Rahman, Hamka & Lin, 2020; Li, 2021). According to Ku-Johari, Bali-Mahomed, Mahmud, Amat & Saadon (2022), psychological well-being is welfare that is free from negative feelings and turns into positive ones. Psychology well-being has several dimensions, including self-acceptance, positive relationships with others, desire to develop, ability to make their own choices, environmental mastery, life goals and personal growth (Tran et al., 2022; Wahyuningsih, Novitasari & Kusumaningrum, 2022). Previous research has documented the benefits of Psychology well-being, for example, related to the level of stress (Tan, Huang, Geng, Cheung & Zhang, 2021), depression and happiness of a person (Ilhan & Otman, 2020).

Prior research has separately investigated the constructs of academic achievement, technology preparedness, and psychological well-being. Nevertheless, there remains a need to ascertain the potential correlation between technological preparedness and psychological well with regards to academic achievement. To address the existing disparity, this study endeavours to introduce an innovative approach that explores the interplay of technological preparedness, psychological welfare, and academic achievement within the context of physical education. This study enhances our comprehension of the perspectives held by many stakeholders, such as lecturers, faculty members, and government officials, on the importance of technology readiness and psychological well-being in attaining academic achievement among student-athletes in the present period.

The objective of this research was to investigate the correlation between technological readiness and the psychological well-being, as well as the academic achievement of elite student-athletes.

Methods

Participants

This study involved eighty-five participants who were elite athlete students from Universitas Negeri Surabaya as one of the reputable universities in Indonesia.

Participants were recruited by sending invitations via WhatsApp to first year until fourth year student athletes, with a total of 156 people. Students who responded and willing to be involved in this study was first-year student athletes who followed football, basketball and volleyball courses, comprises male ($n=40$, age = 19.70 ± 1.18 years, weight = 55.25 ± 2.91 kg, height = 160.12 ± 5.81 cm) and female ($n=45$, age = 19.64 ± 1.13 years, weight = 55.09 ± 2.84 kg, height = 160.18 ± 5.95 cm). Meanwhile, student athletes in the second, third and fourth years revealed that they were not able to take part in this study because uninterested and some of them were participating in several sports competitions. All participants must sign a letter of intent to be involved in all activities in this study.

Research instrument

Technology readiness

The instrument employed to assess technology readiness in this study was derived from a prior investigation conducted by (Ferreira, da Rocha & da Silva, 2013). Item test encompasses multiple aspects, namely optimism (consisting of 5 question items), innovativeness (comprising of 5 question items), discomfort (comprising of 4 question items), and insecurity (comprising of 4 question items). The respondents completed the survey using a Likert scale ranging from 1 (indicating strong disagreement) to 5 (indicating strong agreement) (Chang, Yu, Chao & Lin, 2020).

Psychological:

The present instrument was derived from prior scientific investigations conducted by previous studies (Simons & Bird, 2022; Gani et al., 2023). The instrument consists of a total of 14 question items, which were divided into three subscales. The initial subscale pertains to subjective well-being and consists of three items. For instance, one item inquires about the frequency of feeling happiness while engaging in sports activities within the past week. The second subscale pertains to social well-being and consists of five items. For instance, one item in this subscale asks participants to reflect on their feelings of contribution to a sports team or community over the last week. The third subscale pertains to psychological well-being and comprises six items. For instance, one of the items in this subscale asks participants to indicate the frequency with which they have experienced a sense of purpose in athletics during the last week. Participants have the option to respond to this questionnaire by using a Likert scale, ranging from 0 (never) to 5 (every day).

Academic achievement:

The assessment tool used to measure elite student-athletes academic achievement was test results. The average score of exam results was considered as a measure to observe the progress among elite student-athletes academic achievement (Gustems-Carnicer, Calderon, Calderon-Garrido & Martin-Pinol, 2020; Fokkens-Bruinsma,

Vermue, Deinum & van Rooij, 2021; Yuda et al., 2022). The tests were carried out in three subjects, namely the knowledge test of football, basketball and volleyball.

Design and Procedures

This research was conducted from 6th to 8th October 2022 at the Universitas Negeri Surabaya (Indonesia) and received approval from the head of the physical education study program with permit number: 08/UNESA-11/2022. Researchers conducted this study according to the World Medical Association (Helsinki Declaration), namely the rules of research with human subjects. All test activities were carried out from 08.00-10.00 in the morning. On 6th October 2022, the participants carried out a technology readiness test. On 7th October 2022, all participants took a psychological well-being test. Then in the final activity on 8th October 2022, participants carried out an assessment in terms of academic achievement which includes knowledge tests on football (5 questions), basketball (5 questions) and volleyball (5 questions). For example, participants must answer questions about "what is football". The score for each correct answer was 5 and an incorrect answer was 0.

Statistical analysis

Data obtained from the questionnaire were processed through IBM SPSS v 25.0 (Armonk, NY: IBM Corp) (Jumareng & Setiawan, 2021), with the following steps: searching for descriptive statistics ($M \pm SD$) (Mouloud & Nawal, 2020), testing data normality (Kolmogorov-Smirnov), because the data was not normally distributed, nonparametric calculation was used to determine whether there was a relationship between the variables. We used Spearman's rank correlation coefficient (r). The level of significance was 0.05.

Results

This study shows that the data from technology readiness variables, psychology well-being and academic performance variables are not normally distributed ($p \leq 0.05$). Table 1 shows the descriptive statistical results of the technology readiness variables, psychology well-being and academic performance (Mean \pm Std. Deviation). The results of the Spearman's rank correlation coefficient indicate that there is a positive relationship between technological readiness ($p \leq 0.05$), psychological well-being ($p \leq 0.05$) and academic achievement ($p \leq 0.05$) (Table 2).

Table 1.
Descriptive statistics for each variable

Variables	N	Mean	Std. Deviation
TR-Optimism	85	19.09	2.767
TR-Innovativeness	85	19.19	2.962
TR-Discomfort	85	20.46	2.998
TR-Insecurity	85	19.33	3.080
PW-Subjective	85	12.60	2.094
PW-Social	85	12.94	2.206
PW-Psychological	85	13.12	2.286
AA-Football	85	13.14	2.300
AA-Basketball	85	13.16	2.344
AA-Volleyball	85	13.15	2.363

Note: TR: technological readiness, PW: psychological well-being AA: academic achievement

Table 2.
Correlation Spearman's rho test results between variables (N=85)

Variables		1	2	3	4	5	6	7	8
TR-Optimism	Correlation	1							
	p-values								
TR-Innovativeness	Correlation	0.875**	1						
	p-values	0.000							
TR-Discomfort	Correlation	0.451**	0.597**	1					
	p-value	0.000	0.000						
TR-Insecurity	Correlation	0.993**	0.860**	0.443**	1				
	p-values	0.000	0.000	0.000					
PW-Subjective	Correlation	0.364**	0.376**	0.268*	0.369**	1			
	p-values	0.001	0.000	0.013	0.001				
PW-Social	Correlation	0.429**	0.439**	0.253*	0.432**	0.763**	1		
	p-values	0.000	0.000	0.019	0.000	0.000			
PW-Psychological	Correlation	0.479**	0.495**	0.302**	0.484**	0.651**	0.870**	1	
	p-values	0.000	0.000	0.005	0.000	0.000	0.000		
AA	Correlation	0.378**	0.402**	0.346**	0.378**	0.614**	0.723**	0.832**	1
	p-values	0.000	0.000	0.001	0.000	0.000	0.000	0.000	

Note: TR: technological readiness, PW: psychological well-being AA: academic achievement, **Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed).

Discussion

This study is a pioneering effort to investigate the association between technological readiness and the psychological well-being of elite student-athletes, specifically in relation to their academic achievement.

The first finding from this correlational study indicates that technological readiness has a strong relationship with the achievement of first year elite student-athlete in football, basketball and volleyball courses. The significance of technological readiness as a crucial determinant in facilitating elite student-athletes' effective engagement in the learning process is evident. According to the research conducted by Warden, Yi-Shun, Stanworth & Chen (2022), there is evidence to suggest that technology preparedness has a positive impact on elite student-athletes' engagement and their inclination to actively participate in the learning process. Elite student-athletes with a high level of positive technology readiness exhibit a willingness and awareness to embrace and engage in technology-based learning, as they are able to recognize and acquire the necessary skills (Blut & Wang, 2020). According to Geng, Law & Niu (2019), the effectiveness of the contemporary educational system, which incorporates technology, relies on the preparedness of elite student-athletes to ensure the optimal execution of the learning process. Moreover, the preparedness to utilize technology can enhance elite student-athletes' ability to engage in discussions and connect with both peers and instructors. Additionally, it enables them to efficiently complete assignments that are provided by instructors through online platforms (Bubou & Job, 2020; Jumareng et al., 2021). The findings of this investigation align with prior research indicating that the ongoing COVID-19 pandemic has the potential to negatively impact academic achievement (Kuhfeld et al., 2020). This can be attributed to elite student-athletes' limited readiness to engage in technology-mediated learning, such as inadequate technology literacy or unfamiliarity with computer usage (Hanif et al., 2021), laptops, smartphones, or online platforms (Wang, Xia, Guo, Xu & Zhao, 2022). On the other hand, elite student-athletes who had the readiness to

use technology could get more benefits, such as increased motivation and movement performance (Juliantine, Setiawan, Jumareng, Gani & Asnaldi, 2022; Jumareng, Setiawan, & Németh, 2022) and academic performance (Calabuig-Moreno, González-Serrano, Fombona & García-Tascon, 2020; Jastrow, Greve, Thumel, Diekhoff & Sußenbach, 2022).

The second finding of this study revealed that psychological well-being exhibited a favorable correlation with academic achievement among elite student-athletes. Psychological well-being has been identified as a significant determinant of elite student-athletes' ability to manifest their potential. For instance, studies have found that psychological well-being is associated with the inclination to cultivate positive interpersonal connections (Deng & Yang, 2021), the capacity to exercise autonomy in decision-making (Priambodo, Prakoso & Setyorini, 2022), as well as the attainment of environmental mastery and life goals (Jeoung, 2020). According to Piñeiro-Cossio, Fernández-Martínez, Nuviala & Pérez-Ordás (2021), empirical evidence suggests that there exists a positive correlation between elite student-athletes' level of positive psychological well-being and their academic success. Moreover, the cultivation of positive psychological well-being among elite student-athletes has been found to exert a mitigating influence on many mental health concerns, including depression, anxiety, and stress (Roy & Gupta, 2022). Additionally, it has been observed to alleviate the burden of academic pressure (Ahmad, Ismail & Husain, 2022). Likewise, research by Ríos Garit et al. (2021), reported similar results, psychological aspects highly contributed to athletes' performance. Research by Lochbaum et al. (2022), supported this study results, in competitive sports the psychological aspect has an important role for student athletes to succeed in gaining high achievements.

Finally, the uniqueness and novelty found in this study is that technological readiness and psychological are important factors for producing high academic achievement among elite student-athletes in the first year who are studying football, basketball or volleyball.

Conclusions

Based on the findings and results of our study, it can be concluded that the main finding of this research is the positive correlation between technological readiness and psychological and academic achievement among first-year elite student-athletes enrolled in physical education courses, specifically in soccer, basketball, and volleyball, at the university level.

The main limitation of this analysis is the lack of involvement of participants from the second, third, and fourth years of Universitas Negeri Surabaya, which hinders the ability to generalize the findings to the entire population. Hence, further research should involve a larger number of participants or even include participants from several universities. This study contributes to the academic literature by providing valuable information and insights to stakeholders, such as faculty members and government officials, regarding the importance of technological readiness and psychological well-being in enhancing the academic performance of elite student-athletes enrolled in university-level physical education programs.

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