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The Effect of Digital Technology use on Generation Z'S Mountaineering Activities on Mount Andong

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ABSTRACT

This study aimed to examine the effect of digital technology use on Generation Z's mountaineering activities on Mount Andong. The rapid development of digital technology has transformed outdoor recreational sports activities, particularly among Generation Z, who are highly familiar with smartphones, social media, navigation applications, and other digital tools. This study employed a quantitative approach using a descriptive-correlational survey design. The population consisted of Generation Z hikers aged 17–25 years who actively used digital technology during hiking activities. A total of 30 respondents were selected through purposive sampling. Data were collected using a closed-ended Likert-scale questionnaire measuring digital technology use and mountaineering activities. Prior to analysis, the instruments underwent validity and reliability testing. Data analysis techniques included descriptive statistics, Pearson's product-moment correlation, and simple linear regression using SPSS version 26. The results revealed that the level of digital technology use among Generation Z hikers was categorized as high, with a mean score of 54.67. Similarly, mountaineering activities were also classified as high, with a mean score of 66.77. Pearson's correlation analysis showed a positive relationship between digital technology use and mountaineering activities (r = 0.359), although the relationship was not statistically significant (p = 0.051). Furthermore, regression analysis indicated that digital technology contributed 12.9% to mountaineering activities, while 87.1% was influenced by other variables outside this study. In conclusion, digital technology functions primarily as a supporting tool rather than the main determinant of Generation Z's participation in mountaineering activities.

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INTRODUCTION

The rapid development of digital technology has transformed various dimensions of human life, including sports, tourism, and outdoor recreational activities. The emergence of smartphones, wearable devices, Global Positioning System (GPS) technology, fitness tracking applications, and social media platforms has significantly changed how people interact with physical activities and natural environments. In recent

years, mountain climbing activities have experienced substantial changes due to the integration of digital technology into hiking practices. Activities that were once heavily dependent on conventional navigation skills and direct interaction with nature are now increasingly facilitated by digital tools that assist hikers in route planning, weather monitoring, safety management, and digital documentation. This phenomenon demonstrates that digital technology has become inseparable from modern outdoor recreational activities, particularly among younger generations.

Generation Z is recognized as the generation most closely connected to digital technology because they were born and raised during a period of rapid technological advancement. This generation exhibits high adaptability in utilizing digital media in nearly every aspect of life, including communication, education, entertainment, and sports participation. According to Almukiani et al. (2025), Generation Z tends to integrate digital applications into routine activities because technology is perceived as practical, efficient, and capable of supporting self-expression. In the context of mountain climbing, social media platforms such as Instagram, TikTok, and YouTube have become important instruments for documenting hiking experiences and constructing digital identity among young hikers. Consequently, hiking activities are no longer viewed solely as physical recreation but also as opportunities for content creation and social recognition in virtual communities.

Mountain climbing is categorized as an outdoor recreational sport that requires physical endurance, muscular strength, coordination, balance, and psychological preparedness. Hiking activities provide numerous physical and mental health benefits, including improved cardiovascular endurance, reduced stress levels, enhanced emotional well-being, and increased environmental awareness. Recent studies indicate that outdoor activities contribute positively to psychological restoration and mental health improvement among adolescents and young adults. Syra (2026) explains that interaction with natural environments during hiking activities can reduce anxiety and improve psychological resilience. However, the increasing use of digital technology in hiking activities has gradually altered the nature of outdoor recreation itself. Hikers increasingly rely on digital navigation systems, online reviews, weather forecast applications, and social media recommendations before and during climbing activities.

The influence of digital technology on outdoor sports and recreational activities has become an important issue in sports science and recreational studies. Previous findings reveal that digital technology offers various advantages for hikers. Aryani et al. (2025) explain that GPS-based navigation systems and weather applications improve route accuracy and hiking safety. Similarly, Adani and Setianingrum (2024) found that social media exposure significantly increases young people's motivation to participate in hiking activities because digital content can stimulate curiosity and encourage social participation. In addition, Musridho et al. (2022) reported that fitness tracking applications positively influence consistency in physical activity participation among adolescents and young adults. These findings indicate that digital technology may contribute to increased participation and motivation in outdoor sports activities.

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Despite these advantages, the excessive use of digital technology also creates several concerns regarding the quality of outdoor recreational experiences. Mumtaz et al. (2025) state that overreliance on technology may reduce hikers' environmental sensitivity and situational awareness during outdoor activities. Furthermore, constant engagement with smartphones and social media may limit direct interaction with nature, which is one of the essential values of mountain climbing. Prayoga et al. (2025) argue that excessive focus on digital documentation and online content creation can diminish authentic experiences in natural environments. This condition demonstrates that digital technology produces both positive and negative consequences in mountain climbing activities, particularly among Generation Z users who are highly dependent on digital devices.

Recent studies concerning digital technology and physical activity have shown increasing scholarly attention toward the integration of technology into sports and recreational activities. Research conducted in various countries demonstrates that smartphones and wearable technologies improve physical activity monitoring, communication efficiency, and exercise motivation among young populations. Studies in outdoor recreation contexts also indicate that digital navigation systems contribute to safer and more accessible hiking experiences. Several researchers emphasize that digital platforms facilitate information sharing regarding hiking routes, equipment preparation, and environmental conditions.

In Indonesia, studies related to Generation Z and digital technology generally focus on online communication patterns, social media addiction, e-commerce behavior, and digital literacy. Research exploring the relationship between digital technology and sports participation remains limited, particularly within the context of outdoor recreational sports. Existing studies mostly discuss technology-based learning, online gaming behavior, and digital communication patterns among adolescents. Meanwhile, research specifically examining mountain climbing activities among Generation Z remains underdeveloped despite the increasing popularity of hiking tourism in Indonesia.

Several contemporary studies have begun to investigate the social and psychological dimensions of hiking activities among young people. Research findings indicate that mountain climbing contributes positively to physical fitness, stress reduction, and social interaction. In addition, scholars increasingly recognize the role of social media in shaping outdoor tourism trends and youth recreational preferences. However, most existing studies still analyze hiking activities from tourism, environmental, or psychological perspectives without comprehensively examining the influence of digital technology utilization during climbing activities.

Mount Andong has emerged as one of the most popular hiking destinations among young Indonesian hikers due to its relatively accessible climbing routes, scenic landscapes, and strong digital exposure across social media platforms. Information regarding hiking routes, camping areas, sunrise viewpoints, and travel recommendations is widely available through digital media, making Mount Andong highly

attractive to Generation Z climbers. The integration of digital technology into hiking practices at Mount Andong reflects broader transformations occurring in contemporary outdoor recreation culture among Indonesian youth.

Although previous studies have examined digital technology use and youth recreational behavior separately, empirical investigations specifically addressing the influence of digital technology on Generation Z mountain climbing activities remain limited, particularly in Indonesia. Most prior studies focus on digital communication behavior, online consumer activities, or the motivational aspects of social media use. Meanwhile, research examining how digital technology shapes hiking behavior, physical activity patterns, environmental interaction, and recreational experiences among young climbers is still scarce.

Another important limitation in previous literature is the lack of contextual studies conducted in Indonesian mountain tourism destinations. Existing international findings cannot be fully generalized to Indonesian hiking culture because social behavior, technological access, and recreational motivations may differ significantly across regions and cultural backgrounds. In addition, many previous studies predominantly emphasize the positive impacts of digital technology while paying less attention to its potential negative effects on outdoor recreational quality and environmental awareness.

This study therefore seeks to fill these gaps by investigating the influence of digital technology use on Generation Z's mountain climbing activities at Mount Andong. The research combines perspectives from sports science, outdoor recreation, digital behavior, and youth culture to provide a more comprehensive understanding of contemporary hiking practices among Generation Z.

This study aims to analyze the effect of digital technology utilization on Generation Z's mountain climbing activities at Mount Andong. Specifically, the research investigates how digital tools such as smartphones, GPS navigation systems, fitness applications, and social media platforms influence hiking preparation, participation motivation, safety perception, physical activity engagement, and interaction with natural environments. The novelty of this study lies in its focus on the intersection between digital technology and outdoor recreational sports among Generation Z within the Indonesian context. Unlike previous studies that primarily discuss digital communication or tourism promotion, this research emphasizes the behavioral and experiential dimensions of technology-assisted mountain climbing activities. Furthermore, this study contributes to sports science literature by integrating technology-based recreational behavior into discussions of outdoor physical activity and youth recreation. In addition, the selection of Mount Andong as the research setting provides empirical relevance because the mountain represents one of the most digitally exposed hiking destinations among young Indonesian climbers. Therefore, the findings of this study are expected to contribute theoretically to the development of technology-based outdoor recreation studies and practically to the management of sustainable hiking tourism and youth recreational activities in Indonesia.

In conclusion, digital technology has substantially transformed the characteristics of mountain climbing activities among Generation Z. Although technology offers

convenience, safety, and motivational benefits, it also creates challenges related to environmental awareness and authentic recreational experiences. Considering the limited empirical evidence regarding this phenomenon in Indonesia, particularly at Mount Andong, this study becomes important in providing comprehensive insights into the influence of digital technology on contemporary mountain climbing activities among Generation Z.

METHODS

This study employed a quantitative research approach using a descriptive correlational survey design to investigate the effect of digital technology use on Generation Z's mountaineering activities on Mount Andong. Quantitative research is widely recognized as an appropriate approach for examining measurable social phenomena through objective statistical procedures and empirical analysis. According to Dahlia et al. (2025), quantitative survey methods are effective in identifying behavioral tendencies and relationships among variables within recreational and sports contexts. The descriptive correlational design was selected because the study aimed to examine the relationship and influence between the independent variable, namely digital technology use, and the dependent variable, namely Generation Z's mountaineering activities. Correlational research is commonly used in sports and recreational science to determine the degree of association between behavioral variables without manipulating experimental conditions. Furthermore, this design allows researchers to generate empirical evidence regarding the role of digital technology in shaping outdoor recreational experiences among young people.

The research was conducted on Mount Andong during August 2025. Mount Andong was selected as the research site because it has become one of the most popular hiking destinations among Generation Z in Indonesia due to its accessible climbing routes, scenic landscapes, and strong digital exposure through social media platforms. Recent studies have indicated that digitally popular tourism destinations attract higher participation from younger generations because online visibility significantly influences recreational decision-making (Adani & Setianingrum, 2024). The population of this study consisted of all Generation Z hikers aged 17–26 years who actively utilized digital technology during hiking activities. This age range was selected because Generation Z is characterized by high digital literacy and intensive interaction with technological devices in daily activities (Almukiani et al., 2025).

The sampling technique applied in this research was purposive sampling. Purposive sampling is considered appropriate in behavioral and recreational studies because respondents are selected based on specific criteria relevant to the research objectives. Mardhiyah et al. (2025) explain that purposive sampling enables researchers to obtain data from participants who possess direct experience with the investigated phenomenon. The criteria established in this study included hikers belonging to the Generation Z category, individuals who used digital technologies such as smartphones,

GPS navigation applications, social media platforms, fitness tracking applications, or digital documentation tools during hiking activities, and participants who voluntarily agreed to participate in the study. This approach ensured that the collected data accurately reflected the interaction between digital technology and mountaineering experiences among Generation Z hikers.

Data collection was conducted using a closed-ended questionnaire developed based on the research variables and relevant theoretical frameworks. The questionnaire method is widely used in sports science and recreational research because it allows efficient collection of large-scale behavioral data from respondents (Hidayat & Haryati, 2023). Variables related to digital technology use included smartphone utilization, navigation application usage, digital information access, social media interaction, and digital documentation activities during hiking. Meanwhile, variables associated with mountaineering activities included hiking motivation, physical activity experience, comfort, perceived safety, and social interaction during climbing activities. The research instrument utilized a five-point Likert scale consisting of strongly agree, agree, neutral, disagree, and strongly disagree categories. Likert scales are frequently applied in behavioral and recreational studies because they facilitate systematic measurement of respondents' perceptions and attitudes (Aryani et al., 2025).

Prior to implementation, the questionnaire underwent validity and reliability testing to ensure measurement accuracy and consistency. Instrument validation is essential in quantitative research to confirm that questionnaire items appropriately measure the intended variables (Nashrullah et al., 2023). Validity testing was conducted using Product Moment correlation analysis, while reliability testing employed Cronbach's Alpha analysis. Instruments with Cronbach's Alpha values above 0.70 were considered reliable and acceptable for research purposes. The questionnaire development process was also supported by previous studies concerning digital technology utilization, outdoor recreation, and physical activity behavior among adolescents and young adults (Musridho et al., 2022).

The research procedure consisted of three primary stages: preparation, implementation, and data analysis. During the preparation stage, researchers developed research instruments, conducted preliminary validity testing, and identified eligible respondents according to predetermined criteria. The implementation stage involved distributing questionnaires directly at hiking locations and through digital platforms to participants who were currently hiking or had previous hiking experience on Mount Andong. According to Poddala and Bine (2024), combining offline and online data collection techniques increases respondent accessibility and improves data collection efficiency among digitally active populations. After data collection, questionnaire responses were examined for completeness before proceeding to statistical processing and interpretation.

Data analysis employed descriptive and inferential statistical techniques using statistical software. Descriptive statistics were used to identify patterns of digital technology use and mountaineering behavior among Generation Z hikers. Inferential analysis was conducted to examine whether digital technology use significantly

influenced hiking activities. Before hypothesis testing, prerequisite analyses including normality and linearity tests were performed to ensure data suitability for regression analysis. Hypothesis testing was conducted using Product Moment correlation analysis and simple linear regression analysis to determine the strength and direction of the relationship between variables. According to contemporary recreational behavior studies, regression analysis is highly effective in identifying predictive relationships between technology use and physical activity participation among young populations (Prayoga et al., 2025). The findings obtained from these analyses were subsequently interpreted to explain the extent to which digital technology influences Generation Z's mountaineering activities on Mount Andong.

RESULTS AND DISCUSSION

Result

This study aimed to examine the effect of digital technology use on Generation Z's mountaineering activities on Mount Andong. The study involved 30 respondents aged 17–25 years who actively participated in hiking activities while utilizing digital technology such as smartphones, GPS navigation applications, social media platforms, and digital documentation tools. Data were analyzed using SPSS version 26 through validity testing, reliability testing, descriptive statistical analysis, Pearson Product Moment correlation analysis, and simple linear regression analysis.

Validity Test

The validity test was conducted to determine whether each questionnaire item accurately measured the intended variables. The test used Pearson Product Moment correlation with an r-table value of 0.361 at the 5% significance level.

Table 1.
Validity Test Results for Digital Technology Use Variable (X)

Item	r Observed	r Table	Sig.	Interpretation
X1	0.702	0.361	0.000	Valid
X2	0.681	0.361	0.000	Valid
X3	0.665	0.361	0.000	Valid
X4	0.710	0.361	0.000	Valid
X5	0.412	0.361	0.024	Valid
X6	0.689	0.361	0.000	Valid
X7	0.672	0.361	0.000	Valid
X8	0.438	0.361	0.015	Valid
X9	0.705	0.361	0.000	Valid
X10	0.690	0.361	0.000	Valid
X11	0.668	0.361	0.000	Valid
X12	0.684	0.361	0.000	Valid
X13	0.712	0.361	0.000	Valid
X14	0.695	0.361	0.000	Valid
X15	0.673	0.361	0.000	Valid

The results demonstrate that all items of the digital technology use variable had observed r-values higher than the r-table value (0.361) with significance values below

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0.05. Therefore, all questionnaire items for variable X were considered valid and appropriate for research measurement.

Table 2.

Validity Test Results for Mountaineering Activity Variable (Y)

Item	Observed r	r Table	Sig.	Interpretation
Y1	0.691	0.361	0.000	Valid
Y2	0.568	0.361	0.001	Valid
Y3	0.646	0.361	0.000	Valid
Y4	0.615	0.361	0.000	Valid
Y5	0.370	0.361	0.044	Valid
Y6	0.571	0.361	0.001	Valid
Y7	0.461	0.361	0.010	Valid
Y8	0.557	0.361	0.001	Valid
Y9	0.504	0.361	0.005	Valid
Y10	0.376	0.361	0.041	Valid
Y11	0.567	0.361	0.001	Valid
Y12	0.465	0.361	0.010	Valid
Y13	0.527	0.361	0.003	Valid
Y14	0.536	0.361	0.002	Valid
Y15	0.565	0.361	0.001	Valid

The findings indicate that all questionnaire items related to mountaineering activities also fulfilled validity requirements because all observed r-values exceeded the r-table value and all significance values were below 0.05.

Reliability Test

Reliability analysis was conducted using Cronbach's Alpha to determine the consistency of the research instrument.

Table 3.

Reliability Test Results

Variable	Cronbach's Alpha	Number of Items	Interpretation
Digital Technology Use (X)	0.915	15	Very High Reliability
Mountaineering Activities (Y)	0.819	15	High Reliability

The reliability results show that the digital technology use instrument achieved a Cronbach's Alpha value of 0.915, indicating excellent reliability. Meanwhile, the mountaineering activity instrument obtained a Cronbach's Alpha value of 0.819, which also indicates high reliability. These results confirm that the research instruments were consistent and suitable for further analysis.

Descriptive Statistical Analysis

Descriptive statistical analysis was used to describe the overall characteristics of respondents' answers related to digital technology use and mountaineering activities.

Table 4.

Descriptive Statistics of Research Variables

Variable	N	Min	Max	Mean	Std. Dev.
Digital Technology Use (X)	30	45	62	54.67	5.061
Mountaineering Activities (Y)	30	53	75	66.77	5.594

The descriptive results reveal that respondents demonstrated relatively high levels of digital technology use during hiking activities, with a mean score of 54.67. Furthermore, mountaineering activity scores also showed a relatively high average of 66.77. The standard deviation values indicate that data distribution among respondents was relatively homogeneous.

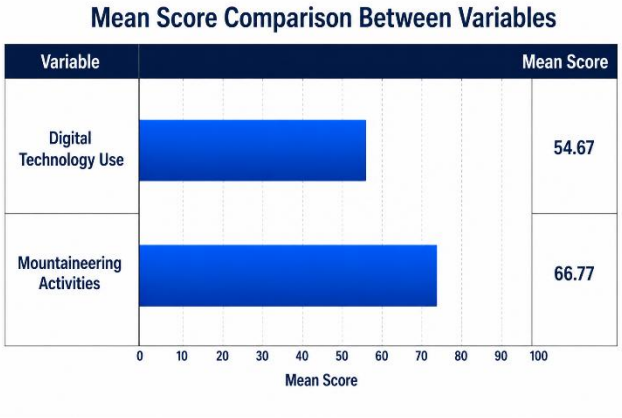

Figure 1.
Mean Score Comparison Between Variables

Pearson Correlation Analysis

Pearson Product Moment correlation analysis was conducted to determine the relationship between digital technology use and mountaineering activities.

Table 5.
Pearson Correlation Test Results

Variables	Correlation Coefficient (r)	Sig. (2-tailed)	Interpretation
Digital Technology Use and Mountaineering Activities	0.359	0.051	Positive but Weak Relationship

The correlation analysis produced an r-value of 0.359, indicating a positive relationship between digital technology use and mountaineering activities. However, the relationship strength was categorized as weak. In addition, the significance value of 0.051 exceeded the 0.05 threshold, indicating that the relationship was not statistically significant.

Simple Linear Regression Analysis

Simple linear regression analysis was performed to determine the extent to which digital technology use influenced Generation Z's mountaineering activities.

Table 6.
Model Summary

R	R Square	Adjusted R Square	Std. Error
0.359	0.129	0.098	5.313

The coefficient of determination (R^2) value of 0.129 indicates that digital technology use contributed 12.9% to Generation Z's mountaineering activities on Mount Andong, while the remaining 87.1% was influenced by other factors outside this study.

Table 7.
ANOVA Test Results

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	116.914	1	116.914	4.141	0.051
Residual	790.452	28	28.230		
Total	**907.367**	**29**			

The ANOVA results show a significance value of 0.051, which is greater than 0.05. Therefore, the regression model was not statistically significant.

Table 8.
Regression Coefficients

Variable	B	Std. Error	Beta	t	Sig.
Constant	45.077	10.702		4.212	0.000
Digital Technology Use	0.397	0.195	0.359	2.035	0.051

Based on the regression analysis, the following regression equation was obtained:

$$Y = 45.077 + 0.397X$$

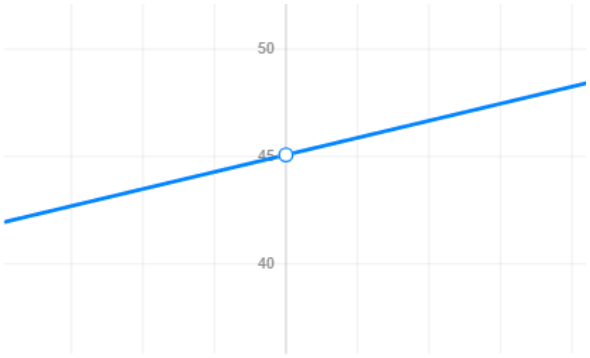

Figure 1.
Results of regression analysis

The regression coefficient value of 0.397 indicates that every one-unit increase in digital technology use was followed by an increase of 0.397 in mountaineering activity scores. Nevertheless, because the significance value was 0.051 (> 0.05), the effect of digital technology use on Generation Z's mountaineering activities on Mount Andong was not statistically significant. Overall, these findings suggest that although digital technology tends to positively support hiking activities among Generation Z, its influence remains relatively weak and is likely affected by various additional factors such as physical fitness, environmental conditions, hiking motivation, and social interaction during outdoor recreation activities.

Discussion

The findings of this study indicate that the level of digital technology use among Generation Z hikers on Mount Andong falls into the high category, with a mean score of 54.67. This result confirms that digital technology has become an inseparable component of modern recreational and outdoor sports activities among young people. Generation Z is widely recognized as a digital-native generation because they grew up in an environment characterized by rapid technological advancement and constant internet connectivity.

Consequently, the integration of smartphones, social media, GPS navigation systems, and digital applications into daily activities has become a natural behavioral pattern among this generation. Previous studies conducted by Nabillah et al. (2024) explain that digital technology significantly supports efficiency, communication, and safety in outdoor recreational activities. Similar findings were also reported by Aryani et al. (2025), who found that navigation applications and online information access improve hikers' preparedness and confidence before engaging in mountain climbing activities.

The high level of digital technology use identified in this study is also closely associated with the characteristics of Generation Z, which tends to rely heavily on digital media for communication, information exchange, and self-expression. In the context of hiking activities, digital platforms such as Instagram, TikTok, and YouTube function not only as communication tools but also as spaces for social identity construction and experience sharing. According to Adani and Setianingrum (2024), social media exposure has become one of the strongest motivational factors encouraging young people to participate in outdoor recreational activities. The desire to document and share hiking experiences online often influences destination selection, hiking preparation, and participation intensity among adolescents and young adults. This phenomenon reflects the growing convergence between recreational sports activities and digital culture in contemporary society.

In addition, the use of digital technology among Generation Z hikers also demonstrates the transformation of mountaineering practices from conventional activities into technology-assisted recreational experiences. Traditionally, hiking activities depended heavily on physical maps, direct environmental observation, and interpersonal communication among climbers. However, current technological advancements have enabled hikers to access digital route maps, weather forecasts, emergency communication systems, and online travel recommendations in real time. Poddala and Bine (2024) explain that digital technology has modernized outdoor recreation by increasing accessibility and reducing uncertainty during hiking activities. Therefore, the high level of technology use observed in this study reflects broader societal changes in the way young people engage with nature and recreational sports.

The findings also indicate that Generation Z's mountaineering activities on Mount Andong are categorized as high, with a mean score of 66.77. These results suggest that respondents demonstrated strong engagement in hiking activities in terms of preparation, participation, comfort, and overall recreational experience. Hiking activities are increasingly viewed not only as physical exercise but also as opportunities for psychological relaxation, social interaction, and lifestyle expression. According to Rohmah et al. (2026), mountain climbing provides multidimensional benefits, including improved physical fitness, emotional recovery, stress reduction, and enhanced social connectedness. Similar studies conducted within outdoor sports science also indicate that hiking activities positively influence cardiovascular endurance, muscular strength, and psychological well-being among adolescents and young adults.

The popularity of Mount Andong among Generation Z hikers may also explain the high level of mountaineering activity identified in this study. Mount Andong is recognized

as one of the most accessible hiking destinations in Indonesia due to its relatively short hiking routes, scenic landscapes, and strong digital visibility across social media platforms. These characteristics make the mountain highly attractive to beginner hikers and young outdoor enthusiasts. Previous tourism and recreation studies suggest that destinations with strong digital exposure tend to attract higher participation from younger generations because online content significantly shapes recreational preferences and travel decisions. In this context, Mount Andong functions not only as a physical recreational destination but also as a digitally mediated tourism space where recreational experiences are continuously documented and shared online.

Despite the high levels of both digital technology use and hiking participation, the Pearson correlation analysis revealed only a weak positive relationship between the two variables, with a correlation coefficient of $r = 0.359$ and a significance value of $p = 0.051$. Although the direction of the relationship was positive, the effect was not statistically significant because the p-value exceeded the 0.05 significance threshold. This finding indicates that higher use of digital technology tends to be associated with increased participation in hiking activities; however, digital technology does not appear to be the primary determinant of Generation Z's mountaineering engagement.

These findings are consistent with the study conducted by Marista et al. (2026), which concluded that digital technology mainly functions as a supporting instrument in outdoor recreational activities rather than a central factor determining participation levels. In outdoor sports contexts, participation is generally influenced by multiple dimensions, including intrinsic motivation, physical readiness, social environment, psychological condition, and previous recreational experiences. According to self-determination theory, intrinsic factors such as enjoyment, personal challenge, and emotional satisfaction often exert stronger influence on physical activity participation than external technological factors. Therefore, although digital applications facilitate hiking activities, the core motivation for engaging in mountaineering activities likely originates from personal recreational interests and psychological needs.

The regression analysis further demonstrated that digital technology use contributed only 12.9% to the variation in Generation Z's mountaineering activities. This relatively small contribution confirms that many other variables beyond digital technology significantly influence hiking participation. Factors such as physical fitness, environmental conditions, social support, outdoor experience, economic accessibility, and individual motivation may exert stronger effects on hiking behavior among Generation Z. Fadia et al. (2026) explain that physical readiness and intrinsic motivation remain the dominant determinants of outdoor sports participation despite increasing technological integration within recreational activities. This finding also aligns with broader sports science literature suggesting that technology functions primarily as a facilitative tool rather than a substitute for physical capability and psychological readiness.

Another important finding of this study concerns the dual impact of digital technology on outdoor recreational experiences. On one hand, digital technology provides significant benefits related to safety, convenience, and information

accessibility. GPS applications help hikers navigate routes more accurately, weather forecasting systems reduce environmental risks, and digital communication platforms improve emergency coordination during hiking activities. These technological supports may contribute positively to recreational comfort and participation confidence among young hikers. According to recent studies by Musridho et al. (2022), fitness and activity tracking applications can increase consistency and motivation in sports participation because users receive continuous feedback regarding their physical activities.

On the other hand, excessive dependence on digital technology may reduce the quality of direct interaction between hikers and natural environments. Continuous smartphone use during hiking activities can distract individuals from appreciating environmental conditions and social interaction within hiking groups. Mumtaz et al. (2025) argue that overreliance on digital devices may weaken situational awareness and environmental sensitivity during outdoor activities. Similarly, Prayoga et al. (2025) emphasize that excessive focus on digital documentation and social media content creation can diminish authentic recreational experiences in nature. In many cases, hikers may prioritize obtaining visually appealing digital content over fully experiencing the psychological and environmental benefits of outdoor recreation.

The findings of this study therefore highlight the importance of balanced and responsible digital technology use during mountaineering activities. Digital tools should be utilized as supportive instruments that enhance safety, efficiency, and accessibility without diminishing the essential values of outdoor recreation, such as environmental awareness, psychological restoration, and direct interaction with nature. For Generation Z, who are highly connected to digital culture, achieving this balance becomes increasingly important to ensure that technological advancement contributes positively to both recreational quality and sustainable outdoor tourism practices.

Overall, this study contributes to the development of sports science and outdoor recreation literature by demonstrating that digital technology positively supports Generation Z's hiking activities but does not significantly determine participation levels. Mountaineering activities remain strongly influenced by multidimensional factors involving physical, psychological, social, and environmental aspects. Therefore, future research should explore additional variables such as motivation, environmental attitudes, physical fitness, and social interaction to obtain a more comprehensive understanding of contemporary hiking behavior among young people in Indonesia.

CONCLUSION

Based on the findings of this research, it can be inferred that the level of digital technology use among Generation Z hikers at Mount Andong is relatively high. Generation Z hikers actively employ smartphones, navigation applications, social media platforms, and various digital tools to facilitate their climbing activities, particularly for accessing information, maintaining communication, route navigation, and documenting their hiking experiences digitally. In addition, the intensity of hiking activities among Generation Z was also categorized as high, reflecting strong involvement and interest in

outdoor recreational sports. The results of the Pearson correlation and simple linear regression analyses demonstrate that digital technology use has a positive association with hiking activities, with a correlation coefficient of 0.359. Nevertheless, the relationship is not statistically significant because the significance value is higher than 0.05 ($p = 0.051$). Moreover, the regression analysis revealed that digital technology usage contributes only 12.9% to the variance in mountain climbing activities, while the remaining 87.1% is influenced by other factors outside the scope of this study, including physical condition, intrinsic motivation, climbing experience, and environmental influences. This study highlights that digital technology functions primarily as a complementary support tool in outdoor recreational sports rather than as the main factor determining participation in mountain climbing activities. Although digital technology provides advantages in terms of convenience, efficiency, and safety during climbing activities, excessive dependence on digital devices may diminish environmental awareness and reduce the quality of interaction with nature. Therefore, the use of digital technology in mountain climbing activities should be applied wisely and in moderation to preserve the authenticity and quality of outdoor experiences.

This study has limitations, particularly a relatively small sample size and a focus on a single research location, namely Mount Andong. Future research is recommended to involve a larger sample, broader research locations, and additional variables related to psychological, environmental, and physical factors that may influence Generation Z's mountaineering activities.

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