AVE Trends in Intelligent Social Letters

The Effect of the Use of Artificial Intelligence on the Empathetic Behaviour of Generation Z

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Abstract: This study investigates how Artificial Intelligence (AI) technology influences the empathetic attitudes of Generation Z students at SMK Sasmita Jaya 2. The study uses a quantitative survey approach. The population comprises 232 students, and the sample includes 148 respondents. Data were collected using a Likert-scale questionnaire comprising 30 statements: 10 statements regarding the 'Impact of AI' variable and 20 statements regarding the 'Empathetic Behaviour' variable. The study used several tests, including validity and reliability tests, normality tests, linearity tests, heteroscedasticity tests, simple linear regression analysis, t-tests, and the calculation of the coefficient of determination. The research indicates that AI use has a positive and significant effect on Generation Z's empathic behaviour. The t-test yields a t-value of 5.001 and a significance level of 0.000, which is less than 0.05; therefore, the research hypothesis is accepted. The regression equation obtained is Y = 22.203 + 0.673X. An R-squared value of 0.146 means that AI use explains 14.6 percent of the variation in empathetic behaviour. These findings suggest that AI can aid learning and information acquisition. However, its use must still be accompanied by direct social interaction, communication, cooperation, and empathy development.

Keywords: Artificial Intelligence; Empathetic Behaviour; Generation Z; Educational Technology; Social Interaction; AI Influence Variable; Empathetic Behaviour Variable.

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1. Introduction

Advances in Artificial Intelligence (AI) technology have transformed the way people access information, learn, communicate and carry out various types of work. AI is used in many forms, such as learning systems, chatbots, recommendation systems and applications that help users access information quickly. In education, AI can support the learning process and provide access

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to a wider range of information sources [1]. The growth of AI has changed how students get and handle information in schools and classrooms. Students can use AI-based apps to find information, get explanations, generate ideas, and get help with their schoolwork instead of relying only on traditional learning materials. This accessibility makes AI more central to students' everyday learning; it is no longer just a technology tool, but part of the environment where students build knowledge and skills [2]. Using AI in education gives students more freedom to get information whenever they need it. Students can get help based on their learning needs and use technology to learn independently [3].

This convenience can motivate students to take more initiative in finding information and tackling academic challenges. As AI becomes more common, it's important to consider how students use technology and connect with others. These changes also shape how young people communicate and interact. Generation Z has grown up in a digital world, so technology has become part of their daily routine. Increased technology use can bring benefits, but overreliance on it can diminish the quality of face-to-face conversations and social interaction if it is not balanced with sufficient human connection [4]. Because they are so connected to technology, Generation Z is a key group to consider when examining the social effects of using AI. For students who grew up around digital devices, using technology to learn and talk with others may feel normal and easy. As a result, changes in technology might also affect how students spend their time each day, how they talk to others, work together, and react to the people in their lives. In school, this matters even more because students learn more than subjects; they also build important social skills by talking and working with others, like friends and teachers. Classroom conversations, teamwork, and direct communication let students encounter different ideas and life experiences. These experiences help students better understand others and develop the ability to feel for them. In this study, empathy is defined as a person's ability to understand, feel and respond to others' feelings and situations.

Davis [3] explains empathy in several ways: understanding another person's situation and responding to their feelings. In a school setting, empathy can be seen in the ability to understand a friend's feelings, listen attentively, feel concerned when others struggle, stand up to unfair treatment, and offer practical help. The relationship between AI and empathy matters because AI use can shape how pupils interact. AI can help pupils access information, understand lessons and recognize different perspectives. However, excessive use may reduce opportunities for face-to-face conversation, collaboration and communication. Previous research has also linked digital technology to the development of empathy and social behaviour among young people [4]. The growth in artificial intelligence use among Generation Z depends heavily on the expansion of the digital environment. Generation Z is a group of people who have grown up at a time when the internet, digital devices, social media and various technology-based applications have become part of everyday life. This means technology is used not only for entertainment, but also to access information, learn, communicate and meet various academic needs [7]. In education, AI can help students access information more easily and support the learning process more flexibly [5]. According to APJII data from 2024 used in this study, 79.5 percent of Indonesians use the internet. Generation Z has the highest internet usage at 34.40 percent. These numbers show how closely connected Generation Z is to the digital world. Because they use the internet so much, young people can access digital information, communication tools, and apps at any time.

In this context, the rise of AI represents another step forward in the digital world Generation Z experiences every day. So, when looking at how Generation Z uses AI, it's important to consider both its learning and social dimensions [6]. As technology becomes more part of everyday life, it can change how students get information, talk to people, and act in their social surroundings [8]. This familiarity is one reason researchers must consider AI use in pupils' lives, particularly as technology becomes part of learning activities and social interactions. On the other hand, technology use in the lives of Generation Z should be viewed not only in terms of its academic benefits, but also in terms of the potential changes it may bring to their social lives. Generation Z has grown up in a digitally saturated environment, so using various devices and applications has become a normal part of daily life. This means technology can influence how they get information, communicate, and interact with others. Using technology without direct communication can reduce opportunities for face-to-face conversation and the building of social relationships [6]. As AI use grows, the way students learn and complete tasks is changing. In typical school settings, students usually get information from teachers, books, class discussions, and interactions with other students. AI offers another resource students can use independently. This can help students find and understand information more flexibly [9].

Independent access to information can affect how students interact with others in social situations. Students can gain more confidence in finding information and solving problems on their own. They may also have more opportunities to learn about topics that aren't clearly explained in class. On the other hand, if students rely completely on technology, they might be less likely to ask questions, share ideas, or talk through problems with others. So, when researchers consider using AI, they should also consider the social situations where students use it. How people use technology affects how they act in social situations, and this matters especially in schools because learning isn't something you do alone. Students gain knowledge by communicating with their teachers and fellow students. Group work, class discussions, peer support, and casual conversations help students see different ideas and experience different emotions. These experiences give you a chance to practice listening, understanding, collaboration, and care for others [10]. AI might affect how students learn without necessarily changing how

they act socially. A student can use AI to finish a task on their own and then talk about what they learned with their classmates. In this case, technology and talking with people can work together to help things go more smoothly.

On the other hand, if AI takes over discussions and teamwork entirely, the social experience might become less rich [11]. This difference matters because AI's effectiveness depends not just on its availability, but also on how students use it in their everyday routines. In the Technological Determinism approach, technology is not merely a tool humans use, but also a factor that can influence how humans carry out various activities. McLuhan [5] argued that technological progress can alter the way humans think, communicate and interact. This study uses this perspective to understand how AI use may influence students' activities, such as how they obtain information, complete tasks and interact with others [7]. In the world of AI, this view matters because AI alters how students get information and finish tasks. Students can get information right away without asking someone else or having a conversation every time. This could help students become more self-reliant in their learning, but it might also affect how often they interact directly with classmates and how they do so. So, AI's impact should be seen not just in what it offers, but in how it might change students' daily interactions [8]. Technology's effect on how people interact isn't always one-sided. Technology can give students access to more information and help them learn about different viewpoints. At the same time, if technology reduces opportunities to talk and work together, students may miss direct experiences that build social understanding [12]. This difference matters when considering how AI use relates to empathy.

This relationship matters in learning environments. When students can get answers and information quickly through technology, their learning habits and communication styles may change. Students may become more independent in completing tasks, but in some situations, excessive technology use may reduce opportunities for direct discussion and collaboration. Therefore, researchers must view AI not only in terms of the convenience it offers, but also in terms of the changes in thinking or behaviour that may result from its use. On the other hand, communicating with others is vital to developing empathy. Empathy is a person's ability to understand another person's situation and feelings, to sense what they are experiencing, and to respond appropriately. In a school setting, this ability shows up in pupils' willingness to listen to peers, understand a friend's difficulties, work together, and be ready to help when needed. Davis [3] views empathy as a complex, multidimensional concept that involves understanding others' situations and responding to their experiences [9]. Empathy is especially important during the teenage years because students often encounter different people, ideas, feelings, and social settings at school. Students talk directly with each other, which helps them hear what others are saying, learn about different opinions, notice how others feel, and help classmates when needed. So, empathy is closely linked to the social situations students face in daily life. In school, empathy helps students understand that everyone has unique feelings and life experiences. Students might meet classmates from different backgrounds who struggle to learn, face personal issues, or deal with emotional challenges. Understanding these differences helps students interact more respectfully when they talk to or work with others.

From this perspective, empathy is not just about feeling sorry for someone else. Students should also learn to understand how others feel and respond appropriately. For example, if a classmate is struggling with an assignment, a caring student might start by trying to understand what's making it hard, notice how the classmate is feeling, and then step in to help. This behaviour shows a mix of knowing what's right, staying in touch with feelings, and taking real steps to act on it. These skills matter for Generation Z because they increasingly interact through digital communication. Digital platforms and artificial intelligence offer new ways to get information and talk to others, but students still face situations where they need help from real people. Examining how AI is used alongside empathy can clarify how technology affects students' social behaviour. The problem isn't about whether AI should be fully embraced or entirely ignored [13]. The real issue is using AI in a way that doesn't take away the human elements essential to teaching. Technology can help students with their schoolwork, but empathy remains essential to maintaining strong relationships at school. In this way, building empathy isn't fully possible without communication and interaction [14]. Although AI can provide information about different situations and viewpoints, students still need real social interactions to learn how to respond appropriately to others.

This raises a key question: Does the growing use of AI help or hinder the development of empathy in Generation Z? In light of this phenomenon, this study directly examines whether AI use influences the empathetic behaviour of Generation Z students at SMK Sasmita Jaya 2. The research hypothesis is that artificial intelligence use influences Generation Z's empathetic attitudes. This issue matters because earlier discussions about technology and empathy don't always yield consistent results. Technology can help people access information and learn more effectively, but relying too much on it might limit opportunities to talk and communicate directly with others. So, researchers can't assume the connection between AI and empathy is always good or always bad. Researchers should test this with real data from students who regularly use AI in school or college. The school setting is a good place to examine this connection because students use technology for learning and still have face-to-face time with others. Using AI to complete assignments and find information might change how students approach learning tasks that used to require talking and working with classmates. Therefore, the relationship between AI use and empathetic attitudes is not always negative or always positive. AI can help students access information and understand different perspectives, but its use may also limit opportunities to interact directly with others. Research on AI use and empathy is needed to provide concrete evidence based on the circumstances of the students participating in the study [15].

2. Methods

This study used a quantitative approach through a survey. The study population comprised 232 students, and the sample size was 148 respondents. Data were collected using a questionnaire with a five-point Likert scale. Variable X comprised 10 statements regarding the use of AI, whilst variable Y comprised 20 statements regarding empathetic behaviour. Data analysis used descriptive statistics, including tests for validity, reliability, normality, linearity and heteroscedasticity, as well as simple linear regression, t-tests and the coefficient of determination. Respondents were selected based on characteristics relevant to the research objectives, namely Generation Z students who utilize Artificial Intelligence in their various activities. The study included 232 students, of whom 148 were respondents. Figure 1 forms the basis for all statistical analyses; consequently, the interpretation of the regression results, t-tests, and coefficient of determination is based on 148 valid data points. The research instrument comprised 30 statements. The AI Influence variable (X) contains 10 statements describing the extent to which an individual uses AI and the impact of such use, whilst the Empathetic Behaviour variable (Y) comprises 20 statements covering the ability to understand others' feelings, recognize their emotional states, empathize with others, be sensitive to injustice, and take concrete actions that demonstrate empathy. All statements use a five-point Likert scale, namely Strongly Agree (SS), Agree (S), Disagree (KS), Disagree (TS), and Strongly Disagree (STS). Data analysis was carried out in stages. Once the instrument was deemed suitable following validity and reliability testing, the data were then examined for normality, linearity and heteroscedasticity. Subsequently, simple linear regression was used to determine the direction of the relationship and the extent to which changes in variable Y depended on variable X; a t-test was used to determine whether this effect was significant; and the coefficient of determination was used to ascertain the extent to which variations in empathetic behaviour could be explained by the use of AI.

3. Results and Discussions

3.1. Descriptive Statistics

The results of the descriptive statistics show that the 'Impact of AI' variable (X) has 148 valid data points. The lowest score is 10, whilst the highest score is 33 (Table 1).

Table 1: Descriptive statistics of the research variables

Variable	N	Minimum	Maximum	Mean
Influence AI (X)	148	10	33	21,5338
Empathy (Y)	148	20	56	36,6892
Std. Deviation X	148	4,23849		

The mean score is 21.5338, the median is 22, the mode is 21, the standard deviation is 4.23849, the range is 23, and the total number of scores is 3,187. The Generation Z Empathy Behaviour variable (Y) has 148 valid data points.

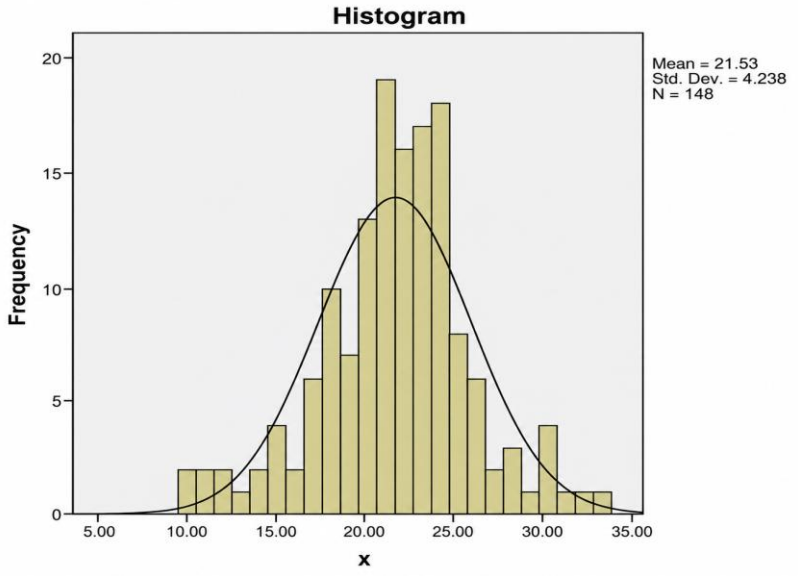

Figure 1: Histogram of the 'impact of AI' variable (X)

The lowest score is 20, whilst the highest score is 56. The mean score is 36.6892, the median is 38, the mode is 40, the standard deviation is 7.45586, the score range is 36, and the total number of scores obtained is 5,430. The histogram for variable X shows that respondents' scores are centred in the middle of the distribution, particularly in the range from 18 to 25 (Figure 2).

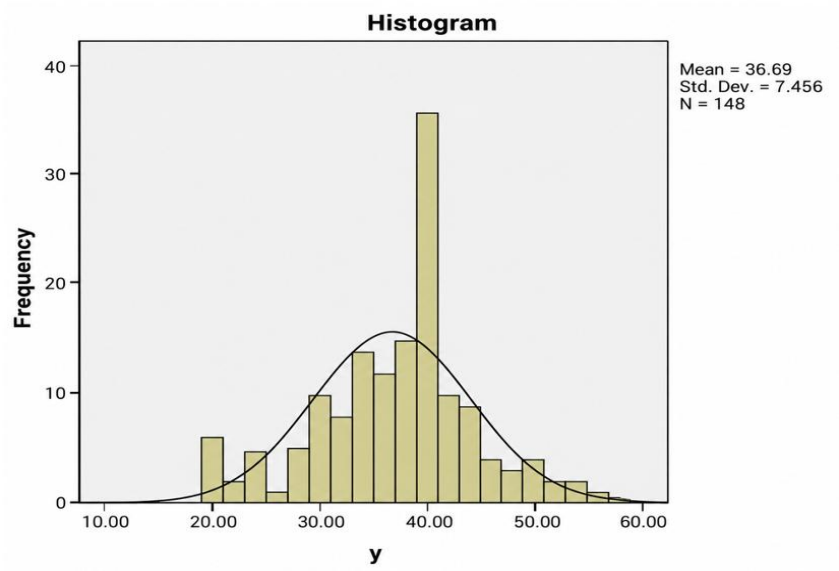

Figure 2: Histogram of the 'Generation Z empathetic behaviour' variable (Y)

The histogram for variable Y shows that scores are concentrated, particularly in the range from 30 to 45, with a high frequency around 40. These descriptive findings indicate that the two variables differ in respondents' scores.

Table 2: Descriptive statistics of the research variables

Variable	N	Minimum	Maximum	Mean	Median	Modus	Std. Deviation
Influence AI (X)	148	10	33	21,5338	22	21	4,23849
Empathetic Behaviour (Y)	148	20	56	36,6892	38	40	7,45586

Based on Table 2, the 'Impact of AI' variable has a mean of 21.5338 and a standard deviation of 4.23849. The lowest score is 10, and the highest is 33, indicating that respondents use AI to varying degrees. Meanwhile, the mean value of the 'Empathetic Behaviour' variable is 36.6892, and its standard deviation is 7.45586. The lowest score is 20, and the highest is 56, indicating variation in respondents' levels of empathetic behaviour. The mean values reflect the respondents' general profile, while the standard deviation indicates the spread of their scores. This variation is significant because respondents do not share the same levels of AI usage and empathetic attitudes. These score differences were then used to test whether the two variables are related.

3.2. Instrument Quality and Prerequisite Tests

All 10 items in the 'Impact of AI' variable and 20 items in the 'Empathy' variable were deemed valid based on the results of the instrument tests. Reliability tests showed a Cronbach's Alpha value of 0.717 for the 10 items in variable X and 0.876 for the 20 items in variable Y. Both values indicate that the instruments possess reasonably good internal consistency (Table 3).

Table 3: Summary of instrument and normality test results

Testing	Results	Information
X-Reliability	Cronbach's Alpha = 0,717	Reliable
Y-Reliability	Cronbach's Alpha = 0,876	Reliable
Normality	Sig. = 0,097	Normal

The One-Sample Kolmogorov-Smirnov normality test yielded a p-value of 0.097. Because 0.097 is greater than 0.05, the residuals are considered normally distributed. The linearity test showed a deviation from linearity of 0.178, indicating a linear relationship between AI usage and empathy. The heteroscedasticity test using the Glejser method yielded a significance value of 0.495, indicating no evidence of heteroscedasticity (Table 4).

Table 4: Summary of prerequisite test results

Testing	Significance Value	Information
X-Reliability	0,717	Reliable
Y-Reliability	0,876	Reliable
Normality	0,097	Normal
Linearity	0,178	Linear
Heteroscedasticity	0,495	There is no heteroscedasticity

These results indicate that the instruments and data used in the study meet the requirements to proceed to the regression analysis stage. Cronbach's Alpha values of 0.717 for variable X and 0.876 for variable Y demonstrate the instruments' ability to measure the concepts consistently. Furthermore, the significance values for normality (0.097), linearity (0.178), and heteroscedasticity (0.495) are all above 0.05; therefore, the analysis meets the assumptions.

3.3. Regression Analysis and Hypothesis Testing

The simple linear regression analysis yields the equation Y = 22.203 + 0.673X. The regression coefficient of 0.673 is positive, meaning that, based on the research data, higher AI usage scores are associated with higher empathy behaviour scores. The t-test yields a t-value of 5.001 and a significance level of 0.000. As 0.000 is less than 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted (Table 5).

Table 5: Results of simple linear regression and the t-test

Model	B	t	Sig.
Constant	22,203	7,522	0,000
Influence AI (X)	0,673	5,001	0,000
R-squared			0,146

Therefore, AI use has a positive and significant impact on Generation Z students' empathetic attitudes at SMK Sasmita Jaya 2. An R value of 0.382 indicates a positive relationship between AI use and empathetic behaviour. An R-squared value of 0.146 indicates that AI use explains 14.6% of the variation in empathetic behaviour (Table 6).

Table 6: Summary of the results of simple linear regression and the t-test

Component	Mark
Constant	22,203
X Coefficient	0,673
Correlation Coefficient (R)	0,382
R-squared	0,146
Calculated t-value (t-statistic)	5,001
Significance (p-value)	0,000

The simple linear regression results show the equation Y = 22.203 + 0.673X. The regression coefficient of 0.673 is positive, meaning that for every one-unit increase in the 'AI Influence' score, there will be a corresponding increase of 0.673 units in the 'Empathetic Behaviour' score within the research model. The t-test yielded a calculated t-value of 5.001 and a significance level of 0.000. As the significance level is less than 0.05, the research hypothesis is accepted. Thus, the use of artificial intelligence has a positive and significant impact on Generation Z's empathetic attitudes among the study's respondents. These positive findings also suggest that students' use of AI should be seen as part of their everyday routines and activities. Students don't use AI by themselves, away from their social surroundings. It remains part of their classrooms, friend groups, families, and other social groups. So, even if people use AI for schoolwork, they still need to talk and work with others. The results suggest that students can use technology alongside talking and working with others. For example, students might use AI to get a basic understanding of a learning problem and then discuss it with classmates or teachers. In this process, AI serves as another source of information, but people remain involved in the learning process.

This pattern can help explain why using AI in this study is linked to more empathetic behaviour. Another way to think about it is that access to information can help students learn about situations outside their everyday lives. Students might learn about how people live together, different ways of thinking, and issues others face. Even though facts alone won't create empathy, more knowledge can help students better understand situations that aren't like their own. The results should be interpreted

carefully. It doesn't mean that AI automatically makes students more empathetic. In this study, the results show that using AI is linked to more empathetic actions among the people involved. This relationship may be supported by AI providing education and information while students remain engaged with their social surroundings. An R value of 0.382 indicates a positive relationship between the two variables. An R-squared value of 0.146, or 14.6 percent, indicates that AI use explains 14.6 percent of the variation in empathetic behaviour. These results suggest that AI influences empathetic behaviour, but it is not the primary determinant.

3.4. Discussions

The main findings indicate that using artificial intelligence (AI) has a positive, significant impact on how Generation Z demonstrates empathy. The statistical results provide clear evidence that the connection between AI use and empathy among the people surveyed goes beyond description. The relationship shows that people who score higher on the AI Influence factor also tend to score higher on Empathetic Behaviour. This finding is important because it shows that using AI in this study doesn't automatically mean students are less able to show empathy. The positive outcome may be linked to how respondents used AI. AI can help students quickly access information, explanations, and different viewpoints, supporting their learning tasks. When students use AI to gather information instead of relying on it entirely to communicate with others, technology can support learning without reducing opportunities to interact with people. This positive effect suggests that, for the study's respondents, AI does not merely reduce empathy. AI can also provide information, support learning, and help students understand issues from a broader perspective [10]. These results may be explained by students' use of AI.

The research instrument measured not only how frequently students used AI but also its effects, such as easier task completion, better understanding of the material, increased independent learning, reduced discussion, and greater reliance on technology. Thus, the score for variable X reflects students' overall experience of using AI. The positive relationship indicates that, within the study group, students can use AI while maintaining empathetic attitudes. This measurement approach is key to understanding our positive results. The AI Influence variable reflects how much students use AI in their studies, for example, whether it helps them with schoolwork and understanding lesson content. Therefore, the results shouldn't be taken as proof that using AI more often directly leads to greater empathy. The results show how students' experiences with AI are connected to the empathetic actions they reported in the study. Using AI can also give students a chance to learn about things they haven't experienced in their own lives. By reading explanations and considering different viewpoints, students can learn more and better understand other people's experiences. This supports the cognitive side of empathy because understanding someone else's situation is key to responding positively. However, the findings do not imply that increased AI use will inevitably lead to greater empathy in all situations. The coefficient of determination indicates that AI accounts for 14.6% of the variation in empathetic behaviour.

This result shows that AI plays a real role in the model and supports the study's connection. The contribution also shows that the relationship should be understood in the context of the people involved and the factors being studied. These findings are also consistent with other studies showing that digital technology can bring both benefits and risks to social relationships. Turkle [4] emphasizes that face-to-face communication is important for maintaining the quality of social relationships [12]. At the same time, Vossen and Valkenburg [7] show that using digital technology is associated with empathy development in adolescents [11]. Santi et al. [6] also indicate that information technology can enhance empathy in education [13]. Thus, the findings suggest that technology's impact on empathy depends on how it is used and whether social interaction complements it. In practical terms, the research suggests that AI must be used in a balanced way. Pupils can utilize AI to support their learning and access information. Still, schools must prioritize activities such as discussions, collaborative work, face-to-face communication, and teaching character values. Used this way, technology can support learning without replacing the social experiences vital to developing empathy.

3.5. Research Findings in Light of Technological Determinism

The positive and important effect found in this study aligns with McLuhan's [5] idea of technological determinism. This view sees technology as a key part of the environment that can shape how people think, communicate, and interact [5]. In this study, AI is more than a tool students use to finish schoolwork; it's also part of the tech world Generation Z grows up in and uses to learn and talk with others. AI can be a helpful tool for learning and social interaction. It can help students find information, organize their thoughts, and understand tough subjects. These functions can help students overcome some challenges they face when learning on their own. However, how students understand and use the information ultimately depends on them. Using AI as a helper is not the same as using AI to replace people in conversations. When students use AI to get information and then share it with others, technology becomes part of a broader learning experience. Students can keep talking to each other, ask for help, offer support, and check on how their classmates are feeling. This difference matters for interpreting the study's results. The positive link between using AI and showing empathy may suggest that students see AI as helpful for their tasks, not as something that replaces personal connections. Students can benefit from technology while still improving their social skills by

interacting directly with others. So, when schools use AI, they should also provide support that helps students keep their ability to think carefully and talk well with others. The goal is not to stop students from using AI, but to ensure that technology's convenience doesn't take away from the social experiences that still matter for students' growth. Using AI alters how students get information. Students no longer need to look through books, ask teachers, or talk to friends to find information. They can now get the same information using AI apps. This change can affect how students learn and communicate. Students can become more independent in their work, but they still need chances to talk and work with others. This suggests that technology's impact isn't always negative. Technology's impact depends on how well it is woven into students' work. When AI is used as a helpful tool, it can provide information and different viewpoints that make situations easier to understand. In this way, technology can shape how people behave, while still letting students stay socially connected.

3.6. Davis's Theory of Empathy

The connection between AI and empathy can also be seen by looking at the difference between understanding someone else's situation and actually reacting to that person. AI can help students get descriptions, explanations, and information about various situations. This could support learning because students can get more information than from a single source. However, knowing something is only one part of showing empathy. Students should also learn to understand others' emotions and respond appropriately in real-life social settings. These skills develop through talking and practice over time. So, AI can help with the informational side of empathy, but real face-to-face interaction remains key to understanding and responding to emotions and behaviour. This view aligns with Davis [3] discussion of empathy in several ways. Empathy isn't just about knowing what someone else is feeling. It also includes how the person reacts to that understanding. So, the connection between using AI and showing empathy should be understood as a broader relationship that may include different parts of how students show empathy. The results also show that AI's learning benefits should not be considered separately from students' ability to understand and use information in a meaningful way. Information from AI becomes more useful when students can use it to understand real-life situations, talk with others, and make good choices.

In this way, technology can support the process, but human understanding and response remain essential. Davis [3] idea offers a different way to understand the results. Empathy is a complex ability that includes understanding and responding to others' feelings and experiences [14]. In a school setting, this ability can show up in students' skills to know how their friends feel, notice when someone is upset, stand up for what's fair, and help out when someone needs support. This study relates to how people think about empathy, as AI gives students a way to learn more and see things from different perspectives. Students can learn about viewpoints that differ from their own. This process can help students better understand other people's situations. However, empathy still needs real face-to-face interactions to develop. A student can learn about someone else's situation through technology, but showing empathy also depends on how the student acts when they meet that person in a real-life social setting. Therefore, the positive connection in this study shows that using AI is linked to showing empathy, not that AI replaces people learning to feel empathy on their own.

3.6.1. Why are the Results Positive?

The lack of a negative connection in this study could be because using technology doesn't always lead to loneliness or isolation. Students can use AI tools even while staying involved in their friendships and participating in class activities. Having a digital learning tool doesn't mean a student will definitely spend less time interacting with others socially. Students can also use AI to do tasks that would normally take a lot of time. By helping students find information quickly, AI can free up time for other schoolwork and social activities. In this case, being efficient with technology doesn't always mean it's bad for talking and connecting with people. The results also show how important it is to consider Generation Z's background and situation. This generation has grown up in a world where digital technology is a regular part of daily life. So, having AI around might not feel like a totally different part of students' social lives. Instead, technology shapes how they learn, communicate, and organize their tasks. That's why the connection between AI and empathy needs to be seen as something that changes and develops over time. The same technology can produce different outcomes depending on how it's used, how much people rely on it, and how much time they spend on digital activities versus face-to-face interactions.

This study examines how these factors relate among Generation Z students at SMK Sasmita Jaya 2. One possible reason for the positive results is how students use AI in their learning tasks. The AI Influence variable includes statements about how much students use AI and its effects on them. So, the variable isn't just about how often something is used; it also reflects what students think about how helpful AI is for their work. AI can help students find information more easily, understand what they are learning better, and complete their schoolwork independently. These functions can give students more chances to explore various subjects and different social settings. When students use that information to learn instead of avoiding talking with others, AI can serve as a helpful tool in the learning process. This perspective also helps explain why the study's results are positive, even though using too much technology carries risks. Having AI around doesn't mean students will automatically act

a certain way socially. Students can use AI tools while participating in discussions, group tasks, chatting, and collaborative work. So, how AI is used becomes a key factor when understanding its connection to empathy.

3.7. Comparison with Previous Research

This study's results align with earlier research showing that technology can help build empathy in school environments. Santi et al. [6] discovered that information technology can help students develop empathy in certain ways [15]. This finding matters for the current study because both studies show that technology doesn't always hinder social and emotional growth. Instead, technology can be a helpful tool when properly integrated into educational activities. These results also connect with Vossen and Valkenburg's [7] study on how digital media affects empathy in teenagers [14]. Their study shows that using digital technology can help teenagers develop empathy. This provides a broader context for the current result, where using AI is linked to more empathetic actions among Generation Z students. However, the results should also be viewed in light of Turkle's [4] view on the value of face-to-face conversation. Turkle [4] stresses how talking directly helps keep social connections meaningful [8]. This view matters because AI's advantages shouldn't lead students to stop having direct conversations with technology. Students need chances to talk with friends, hear what others are saying, join group tasks, and respond to different social situations. The results also highlight different points than studies that discuss the potential negative social effects of using AI among people born in the early 2000s. A study by Syahputra et al. [9] shows that AI can make learning more efficient. Still, it may also raise social and communication issues if it isn't used properly and with guidance [9]. The results show that the link between technology and social behaviour may change depending on the situation and how the technology is used. This difference doesn't always mean one result is wrong or invalid. So, the results suggest that AI can be helpful in some ways but also carries risks.

In this study, the positive link may reflect how people use AI to learn and stay engaged with their social surroundings. On the other hand, relying too much on technology can lead to different outcomes when it replaces face-to-face communication and teamwork. This suggests that technology's effect on empathy is more complex than simply good or bad. AI can help students access information and learn better, but it's still important to balance it with face-to-face interactions. The main point is not just whether students use AI, but how they use it and whether their technology use still includes important social interactions. The school setting plays a key role in understanding the results. Schools are places where students learn academic skills while also learning how to behave and get along with others. AI is used alongside classroom teaching, conversations with classmates, group work, and communication with teachers. Teachers play a key role in ensuring students use AI appropriately. AI can help students find information and build their knowledge. At the same time, teachers can create activities that ask students to share their thoughts, listen to others, work together as a team, and consider different viewpoints. Group activities are especially important because they give students real chances to practice being empathetic. When students work together, they should divide tasks, use each person's strengths, resolve disagreements, and support one another when needed. AI can't fully replace these experiences because they require real face-to-face interaction. So, the good connection found in this study suggests researchers should use technology wisely, not just use it a lot without thinking. AI can support other teaching methods in the classroom, and schools can still offer opportunities for real, personal interactions between students and teachers. This approach lets technology grow alongside students' social and emotional skills.

3.8. Implications of the Research

In practical terms, the findings suggest using AI in a balanced way. The results show that using AI in schools can have real-world effects. This study found that schools don't have to avoid AI to ensure students stay kind and understanding toward others. Instead, schools can use AI in learning tasks while still allowing face-to-face communication and social engagement. Teachers can help students use AI as a learning tool, but they should still assign tasks that require talking, collaboration, group activities, and direct communication. These activities help students see things from others' perspectives and learn to meet others' needs. In this way, AI can support academic work without replacing the social experiences that help students learn empathy. The results show students how important it is to use AI responsibly. AI can help students find information, make sense of what they're learning, and consider things from different angles. Students should keep talking directly with their friends and teachers and take part in group activities. The skill of understanding and reacting to others grows from both learning and real-life social interactions. The results suggest that balanced technology use is beneficial. AI can be a helpful tool in today's education, but it should be used alongside human teachers and interaction.

Using both technology and real-life social interactions can help students improve their learning skills and become more understanding and caring people. Taken together, the results show that, in the situation studied here, using AI is positively and meaningfully connected to empathy among Generation Z students. The findings show that as AI becomes more common, it doesn't always mean people are becoming less empathetic. AI can support positive social behaviour when students use it for learning tasks, as long as they still have face-to-face interaction. The results also support the idea that technology and human progress don't have to conflict. AI helps students with technology, while talking with others helps them learn empathy. Both

parts can work together when technology is used in the right way. So the main issue isn't just how much AI students use, but how they fit it into their studies and everyday life. Using AI responsibly, staying connected through communication and having chances to interact directly are key to getting the most out of AI without forgetting to develop caring and understanding behaviour.

4. Conclusion

According to the research findings, artificial intelligence has a positive and significant impact on the empathetic attitudes of Generation Z students at SMK Sasmita Jaya 2. The t-test results showed a value of 5.001 with a significance level of 0.000. The R-squared value was 0.146, meaning it accounts for 14.6 percent of the variation. Based on the simple linear regression results, the equation $Y = 22.203 + 0.673X$ indicates that AI use positively affects empathetic behaviour. In this model, a higher AI usage score is associated with a higher empathetic behaviour score. The t-test result obtained was 5.001 with a significance level of 0.000, which is less than 0.05, thus indicating that this effect is statistically significant. The R-squared value of 0.146, or 14.6 percent, indicates that AI usage explains approximately 14.6 percent of the variation in empathy behaviour observed in Generation Z. Therefore, the findings do not imply that AI is the sole factor influencing students' levels of empathy. Various factors can still influence an individual's empathetic behaviour, including family environment, school, friends, character education and experiences of interacting with others. Generally, AI can benefit pupils when used correctly as a learning aid and source of information.

However, AI use must be balanced with direct social interaction so pupils can continue to develop their ability to understand, empathize with, and respond to others' circumstances. Schools and pupils should see AI as an aid to learning, not a substitute for the communication and social experiences that shape empathetic attitudes. The results also show that using AI should be seen as part of the bigger picture of students' learning and social surroundings. AI can make information easier to access and support study, but students still learn to be kind and understanding by spending time with others and sharing experiences. So, using AI doesn't always mean it's bad for building empathy. In school settings, the results show that AI can be a helpful learning tool while still allowing students to have direct conversations, work together, and interact with each other. Students should use AI smartly and fairly, and not rely on it instead of talking with teachers and friends. Using technology wisely can help students benefit from AI while still learning to understand and interact with people. The study shows that AI has a positive, important effect on how Generation Z students show empathy, with an effect size of about 14.6%. The results show that balancing technology with human connection is important so AI can help students with their schoolwork without losing sight of the need to build empathy.

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References

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach," 4th ed., *Pearson*, Hoboken, New Jersey, United States of America, 2021.
2. F. Miao and W. Holmes, "Guidance for Generative AI in Education and Research," *UNESCO*, Paris, France, 2023.
3. M. H. Davis, "Measuring individual differences in empathy: Evidence for a multi-dimensional approach," *Journal of Personality and Social Psychology*, vol. 44, no. 1, pp. 113–126, 1983.
4. S. Turkle, "Reclaiming Conversation: The Power of Talk in a Digital Age," *Penguin Press*, New York, United States of America, 2015.
5. M. McLuhan, "Understanding Media: The Extensions of Man," *McGraw-Hill*, New York, United States of America, 1964.
6. G. F. Santi, H. Helma, and R. W. Nita, "The Effectiveness of the Emotional Intelligence Development Program in

Improving Empathy Aspects (EMPATHY) Based on Information Technology (A Study for Students in Class X MIA 1 SMAN 2 Bayang, Pesisir Selatan Regency)," *Jurnal Pendidikan Dan Konseling (JPDK)*, vol. 4, no. 4, pp. 3635–3641, 2022.
7. H. G. M. Vossen and P. M. Valkenburg, "Do social media foster or curtail adolescents' empathy? A longitudinal study," *Computers in Human Behavior*, vol. 63, no. 10, pp. 118–124, 2016.
8. W. Ren and I. Tahir, "Pragmatic translanguaging among Indonesian multilingual youth on social media," *Journal of Pragmatics*, vol. 260, no. 7, pp. 64–77, 2026.
9. F. Syahputra, E. Sabrina, A. Anggraini, A. Syahbila, and U. Abdurrahman, "The Impact of Artificial Intelligence Utilization on the Social Behavior of Generation Z in the Digitalization Era: A Literature Review," *Journal of Education Transportation and Business*, vol. 2, no. 2, pp. 673–678, 2025.
10. M. Saud, A. Ibrahim, and A. Ashfaq, "Youth revelation of social media on multiculturalism and cultural integration in Indonesia," *Social Sciences & Humanities Open*, vol. 11, no. 5, pp. 1–10, 2025.
11. K. Zhang and A. B. Aslan, "AI technologies for education: Recent research & future directions," *Computers and Education: Artificial Intelligence*, vol. 2, no. 6, pp. 1–11, 2021.
12. P. Bhatnagr and A. Rajesh, "Artificial intelligence features and expectation confirmation theory in digital banking apps: Gen Y and Z perspective," *Management Decision*, vol. 63, no. 10, pp. 3642–3675, 2025.
13. D. Magni, G. Del Gaudio, A. Papa, and V. D. Corte, "Digital humanism and artificial intelligence: the role of emotions beyond the human–machine interaction in Society 5.0," *Journal of Management History*, vol. 30, no. 2, pp. 195–218, 2024.
14. M. Pham, Y. K. Ha, P. H. Nguyen, V. T. H. Nguyen, and T. K. T. Dinh, "AI Chatbot characteristics and Gen Z consumers' purchase behavior: A cognitive-affective-behavioral perspective," *Acta Psychologica*, vol. 268, no. 8, pp. 1–10, 2026.
15. A. Wong and J. Wong, "How anthropomorphic features in service robots foster co-creation and wellbeing among Gen Z consumers?" *Young Consumers: Insight and Ideas for Responsible Marketers*, vol. 26, no. 3, pp. 420–440, 2025.

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