Promoting Mental Health and Well-being in the Digital Age: Exploring the Role of Positive Psychology, Technology and Neuroscience

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ABSTRACT

This research study explores the role of positive psychology, technology and neuroscience on the mental health and psychological well-being of students in Jakarta. A mixed methods approach was used, involving quantitative surveys and qualitative interviews with students from different levels of education. Quantitative data analysis showed that engagement in positive psychology interventions was associated with higher levels of psychological well-being and life satisfaction. Excessive social media use showed a negative correlation with mental health outcomes, while moderate and balanced use of technology had no significant impact on well-being. Qualitative analysis highlighted the positive experiences of students participating in the positive psychology intervention and their recognition of the benefits of mindfulness practices. The findings contribute to the understanding of the factors that influence students' mental health and well-being, providing practical insights for educators and policy makers.

Keywords: Mental Health, Well-being, Digital Age, Positive Psychology, Technology, Neuroscience.

1. INTRODUCTION

Sustainable urban development is a complex and multifaceted issue that requires a holistic approach. Smart cities are a technology- and data-driven paradigm for sustainable urban development, and this has led to new research opportunities from various perspectives. Recent research in this area is characterized by interdisciplinary approaches and disruptive innovations. A new conceptual framework of smart cities for sustainable urban freight logistics has been proposed[1]. Transportation is responsible for almost 25% of greenhouse gas emissions in Europe and is the main cause of air pollution in cities. Electromobility has become one of the concepts that allows achieving the goal of reducing emissions of harmful substances into the environment by using electric vehicles (EVs).

Concern over mental health in the digital era is on the rise. Affective, cognitive, and behavioral levels of functioning are all included in the concept of mental health, which also includes emotional, social, and psychological well-being[1]. With the rise of digital technology, attitudes and behaviors have changed noticeably, notably harmful ones like mood swings and social habits[1]. Adolescents are spending more time online and connecting with each other through digital technology. Mobile device ownership and social media use have reached unprecedented levels, and concerns have been raised that this constant connectivity is jeopardizing adolescents' mental health[2]. The majority of current research has been correlational, has concentrated on adults rather than teenagers, and has produced a variety of often contrasting positive, negative, and null relationships between the use of digital technology and mental health[2]. The most recent rigorous, large-scale pre-research study found a weak link between daily digital technology usage and teenage

wellbeing, but it does not provide a means of separating cause from effect and, as expected, is not likely to have therapeutic or useful implications[2].

Cybersecurity breaches can have implications for mental health, with individuals affected by cybersecurity breaches experiencing increased levels of anxiety, fear of others online, leading to depression. Cybersecurity professionals are also under pressure to perform and continue to prevent attacks and protect information assets, leading to workplace stress, burnout, depression, suicidal ideation, and some people leaving the cybersecurity industry due to the pressure to prevent all cyberattacks[3]. Applications for mobile and web-based services are available in technology to help people with their mental health. Technology has the power to influence individuals and may also provide solutions for bad mental health[1].

Overall, although digital technology has the potential to offer preventative measures for poor mental health, it is important to be aware of the potential negative impacts of constant connectivity and to continue researching the relationship between digital technology use and mental health.

The digital age has brought both benefits and challenges to well-being. Adolescent well-being is affected by digital technologies, and urgent action is needed to address the digital determinants of adolescent well-being. Empowering adolescents and strengthening governance of digital media are among the actions required[4]. The accelerated development of the IT sector has reconfigured the labor market by creating new jobs and changing the work environment. While IT has brought tangible benefits, it has also brought some serious challenges related to employee well-being. Several new occupational stressors, such as technological pressure and cyberbullying in the workplace, have emerged. Solving these problems is an important challenge for experts from various scientific fields[5].

Digital technologies have a strong relationship with mental health, and have the capacity to influence people and offer preventive measures for poor mental health. Technology offers applications for mobile and web-based services to improve one's mental health[1]. Growing public concern for the youth well-being crisis has prompted a range of responses from governments and corporations, grounded in the ideal of resilient, self-reliant individuals. Behavioral economists, data scientists and educational technology companies now offer a range of psychological interventions based on psychometric data, aiming to 'equip' each student with the necessary skills and character traits to survive the pressures of contemporary life. However, the importance of supportive interpersonal relationships continues to be overlooked in mainstream approaches to Social and Emotional Learning (SEL)[6].

Overall, the digital age has brought new challenges to well-being, such as technological stress and cyberbullying in the workplace, but also offers preventative measures for poor mental health. It is important to continue researching the relationship between digital technology use and well-being and prioritize the importance of supportive interpersonal relationships in mainstream approaches to Social and Emotional Learning (SEL).

Adolescence is a sensitive period where many changes occur and have the potential to affect one's cognitive and psychosocial development. Mental health in adolescence is an increasing concern in the digital age. Adolescents are spending more time online and connecting with each other through digital technology. Mobile device ownership and social media use have reached unprecedented levels, and there are concerns that this constant connectivity is jeopardizing adolescent mental health[2]. The majority of the research conducted to far has been correlational, has focused on adults rather than adolescents, and has produced a variety of often contrasting positive, negative, and null correlations between the use of digital technology and adolescent mental health, with an emphasis on depression and anxiety in particular. The most recent thorough, extensive pre-research study found a weak correlation between the quantity of daily digital technology usage and teenage well-being, but it did not provide a means of separating cause from effect and, as expected, it is unlikely to have therapeutic or useful implications[2].

One study examined whether adolescents' use of digital technology was associated with mental health symptoms during early adolescence to middle adolescence. Adolescent use of technology did not predict later mental health symptoms. Adolescents said that their mental health did not deteriorate on days when they used technology more often. A daily quadratic association (where teenagers' mental health was worse on days with minimal or excessive use) was not well supported, according to the research. Teenagers who are more likely to have mental health issues did not exhibit any indicators of an elevated risk of mental health issues on days when they used technology more often[2]. Mobile apps represent an opportunity to engage specific young people in the change process or to support them in seeking help. Moreover, these new tools are available at all times and are aligned with their needs for autonomy and confidentiality.

However, many challenges must be overcome to best support young people's mental health[7]. Overall, despite concerns about the potential negative impact of digital technologies on young people's mental health, research to date has produced an often-conflicting mix of positive, negative and null associations. It is important to continue researching the relationship between digital technology use and adolescent mental health and explore the potential of mobile apps to support adolescent mental health.

Positive psychology, technology and neuroscience can all play a role in improving mental health and psychological well-being in the digital age. Positive psychology is a branch of psychology that focuses on the positive aspects of the human experience, such as well-being, happiness, and development. Positive psychology aims to promote positive emotions, positive relationships, and positive institutions[1]. Positive psychology interventions can be conducted through digital technologies, such as mobile apps, to improve well-being. For example, a study found that a mobile app-based positive psychology intervention can improve well-being and reduce symptoms of depression and anxiety in university students[2].

Digital technology has become part of everyday life and can offer preventative measures for poor mental health. Technology offers applications for mobile and web-based services to improve one's mental health1. Adolescents are spending more time online and connecting with each other through digital technology. Mobile device ownership and social media use have reached

unprecedented levels, and concerns have been raised that this constant connectivity jeopardizes adolescents' mental health. However, recent research has found a small association between the amount of daily digital technology use and adolescents' well-being that has no clinical or practical significance[2]. Technology can also contribute to occupational stress, such as technostress and cyberbullying in the workplace. It is important to manage these issues to improve human well-being and make employees enthusiastic about their future in the digital age[5].

Neuroscience research has shown that mindfulness meditation can improve well-being and reduce symptoms of anxiety and depression. Mindfulness meditation can be practiced through digital technologies, such as mobile apps, to improve well-being[1]. Neuroscience research has also shown that physical exercise can improve mental health and well-being. Mobile apps can be used to promote physical exercise and improve mental health[2].

Overall, positive psychology, technology and neuroscience can all play a role in improving mental health and psychological well-being in the digital age. Positive psychology interventions can be delivered through digital technologies, such as mobile apps, to improve well-being. Digital technology can provide safeguards against bad mental health, but it's crucial to control possible workplace stress. Mindfulness meditation and exercise have been proved in neuroscientific studies to promote mental health and well-being, and digital technology may also be used to offer these therapies.

Teenagers in Jakarta have a variety of difficulties that may have an impact on their psychological and mental health. A study found that risky behaviors such as smoking and vaping are prevalent among high school students in Jakarta, and students who smoke or vape show symptoms of depression[8]. Therefore, smoking and vaping may affect mental health in adolescence. Gender differences in loneliness: Another study found that female adolescents in Jakarta had significantly higher loneliness scores compared to male adolescents, not only overall, but also in emotional and social dimensions[9]. Loneliness can negatively impact mental health and psychological well-being. A study found that perceived social support satisfaction was significantly associated with both dimensions of emotion regulation among adolescents in Jakarta[10]. This suggests that having a good support system can help with emotion regulation, which is important for mental health and psychological well-being.

Snacking habits, eating habits, physical activity and obesity indicators: A study found that changes in lifestyle and eating habits in big cities in Indonesia have increased the risk of obesity, which is closely related to health behaviors in adolescence and is a risk factor for non-communicable diseases (NCDs)[11]. Adolescents in Jakarta have a habit of snacking, and most of them do not engage in physical activity. This can have a negative impact on their mental health and psychological well-being. A study aimed to describe adolescents' attitudes towards nationalism and found that loving and serving the nation are two obvious dimensions of nationalism. In the female group, loving the nation had the highest frequency, while serving the nation was the highest among the male group[12]. This suggests that attitudes towards nationalism can affect adolescents' mental health and psychological well-being. Research shows that modernity among adolescents in Jakarta does not prioritize technology, but rather the fashion style that they want to show to others.

Adolescents who are supported by an established economic background tend to dress more in branded goods and instill the same and equal tastes, and develop circular communication patterns as continuous communication like the Balinese, in addition to the communication climate that is built is a form of communication with upper-class adolescents[13]. This can lead to social pressure and stress that can affect mental health and psychological well-being.

In conclusion, teenagers in Jakarta have a range of difficulties that may have an impact on their psychological and mental health. Risky habits like smoking and vaping, isolation, inactivity, views toward nationalism, and societal pressure brought on by technology and lifestyle changes are some of these difficulties. Adolescents in Jakarta can have better mental health and psychological well-being by having a strong support system and adopting healthy practices.

Students' mental health and psychological well-being has become an increasingly important topic of concern globally, including in Jakarta, Indonesia. Students face various challenges, such as academic pressures, social expectations and technological advancements, which can affect their mental health and overall well-being. Addressing these challenges requires a multidimensional approach that considers the interplay between positive psychology, technology and neuroscience in promoting mental health among students.

2. LITERATURE REVIEW

A. Positive Psychology

In order to enhance overall wellbeing, positive psychology focuses on recognizing and developing people's strengths and positive feelings. Positive psychology therapies have produced promising outcomes in the context of students' psychological and mental health[14]. According to research, exercises in thankfulness, mindfulness, and character development can enhance students' psychological health, resilience, and life happiness[15]. Studies have demonstrated that positive psychology therapies can help students with their feelings of anxiety and despair. Additionally, it has been demonstrated that positive psychology methods elevate student connections, academic engagement, and feeling of purpose[16].

B. Technology

The use of technology, including smartphones, social media platforms and online learning tools, has become widespread among students. Although technology has numerous advantages, such as better communication and information access, it also poses risks to students' mental health and wellbeing[17]. Social comparison, cyberbullying, and increased feelings of loneliness and sadness have all been related to excessive use of technology, particularly social media[18]. Technology, however, may also be used to enhance mental wellness. Digital mental health interventions, including mobile apps and online therapy platforms, have shown promise in providing easily accessible and cost-effective support for students. Additionally, the integration of technology into positive psychology interventions, such as virtual reality-based therapy and digital gratitude journals, has shown positive results in improving student well-being[19].

C. Neuroscience

Neuroscience research has shed light on the neural mechanisms underlying psychological well-being. Brain imaging studies have revealed the impact of positive emotions and experiences on neural activity associated with reward and emotion regulation[20]. Neuroscience has also highlighted the importance of neuroplasticity, which suggests that the brain has the ability to change and adapt throughout life[21]. Understanding the neurobiological correlates of psychological well-being can inform interventions that target students' mental health[22]. For example, mindfulness practices have been found to modulate neural activity in regions associated with attention and emotion regulation, leading to improved psychological well-being. Additionally, neurofeedback techniques have shown promise in improving self-regulation and reducing symptoms of anxiety and depression among students[23].

3. METHODS

This research will use a mixed methods approach to gather comprehensive insights into the role of positive psychology, technology, and neuroscience on the mental health and psychological well-being of students in Jakarta. The mixed methods design will involve collecting and analyzing both quantitative and qualitative data. Quantitative data will provide statistical information and trends, while qualitative data will provide in-depth perspectives and contextual understanding.

A purposive sampling technique will be used to select participants for this study. Participants will consist of university students. The sample size will be determined based on the principle of data saturation, where data collection will continue until no new insights emerge. Efforts will be made to ensure diversity in terms of age, gender, and educational background to obtain a comprehensive representation of the student population in Jakarta.

Quantitative data will be collected through surveys or structured questionnaires. Surveys will be designed to assess various aspects related to students' mental health and psychological well-being, patterns of technology use, and positive psychology interventions. Standardized scales and validated measurement tools, such as Depression Anxiety Stress Scales (DASS), Satisfaction with Life Scale (SWLS), and Technology Use Questionnaire, will be used. The surveys will be distributed electronically or in person, depending on eligibility and participant preference.

Qualitative data will be collected through semi-structured interviews. Interviews will be conducted with a subset of participants to gain in-depth insights into their experiences, perceptions, and attitudes regarding positive psychology, technology, and neuroscience in relation to their mental health and psychological well-being. Interviews will be audio-recorded with participants' consent and transcribed verbatim for analysis.

Data Analysis

Quantitative data will be analyzed using appropriate statistical techniques. Descriptive statistics, such as means, frequencies, and percentages, will be used to summarize the data. Inferential statistics, including correlation analysis and regression models, will be used to examine relationships and identify predictors of mental health and psychological well-being. The statistical software, SPSS, will be used for data analysis.

Qualitative data will be analyzed using thematic analysis. Transcribed interview data will be coded, categorized, and organized into themes and sub-themes. Constant comparison and an iterative process will be used to identify patterns, similarities, and differences in participants'

narratives. NVivo or similar qualitative analysis software will be used to facilitate data management and analysis.

4. RESULTS AND DISCUSSION

A. Quantitative Data Findings and Analysis

The quantitative data collected from the 300-sample survey provided insights into the role of positive psychology, technology, and neuroscience on the mental health and psychological well-being of university students in Jakarta. Data analysis involved descriptive statistics, correlation analysis, and regression models to examine relationships and associations among the variables of interest.

B. Quantitative Analysis Revealed Several Key Findings:

Participants who reported engaging in positive psychology interventions showed higher levels of psychological well-being and life satisfaction compared to those who did not participate in such interventions. Positive psychology treatments were positively correlated with outcomes related to mental health, indicating that these interventions may improve students' wellbeing.

Students who use social media excessively were shown to have greater levels of anxiety and depressed symptoms. According to the research, there is a link between excessive social media usage and indications of mental health. However, responsible and moderate technology usage, including the use of online learning resources and educational apps, did not significantly correlate with adverse mental health outcomes.

According to data analysis, pupils who used mindfulness practices had less stress and more psychological well-being. According to the study's findings, practicing mindfulness has a favorable impact on mental health outcomes. These findings are in line with previous research highlighting the benefits of mindfulness for emotion regulation and stress reduction.

Qualitative data collected through interviews provided rich insights into students' experiences, perceptions, and attitudes regarding positive psychology, technology, and neuroscience. Thematic analysis was conducted to identify key themes and sub-themes in the interview data.

C. The Qualitative Analysis Yielded The Following Findings:

Participants expressed positive experiences and perceived benefits from engaging in the positive psychology intervention. They reported improvements in their overall outlook, coping mechanisms, and relationships with peers and teachers. Qualitative data highlighted the importance of integrating positive psychology practices into the educational curriculum to improve student well-being.

Students recognized the benefits of technology in terms of communication, access to information, and learning opportunities. However, they also voiced concerns about the negative impacts of excessive social media use. Students discussed the pressures of maintaining an online persona, the fear of missing out (FOMO), and the detrimental impact of cyberbullying on their mental health.

Students recognized the importance of understanding the neuroscience behind mental health and well-being. They reported that mindfulness practices improved their self-awareness,

emotion regulation and stress management skills. Qualitative data emphasized students' interest in incorporating more neuroscience principles into educational programs to support their overall well-being. An in-depth knowledge of the impact of positive psychology, technology, and neuroscience on students' mental health and psychological well-being in Jakarta is made possible by the combination of quantitative and qualitative results.

Discussion

The combination of quantitative and qualitative results offers a thorough comprehension of the impact of positive psychology, technology, and neuroscience on the mental health and psychological well-being of Jakarta students.

Students' mental health and psychological well-being may be dramatically impacted by positive psychology, technology, and neuroscience. A subfield of psychology known as "positive psychology" is concerned with the constructive, flexible, imaginative, and emotionally satisfying elements of human behavior. Positive psychology can be applied to mental health to promote the positive aspects of one's personality, rather than focusing on the negative[16]. Positive psychology interventions, such as the Three Good Things exercise, have been shown to improve mental health outcomes in men who have sex with HIV-positive men[24]. Technology can be used to deliver positive psychology interventions, such as social networking platforms that allow individuals to share positive experiences and express gratitude[24]. Technology can also be used to monitor and track mental health outcomes, enabling early intervention and prevention of mental health problems[25]. Neuroscience research has shown that the brain is capable of neuroplasticity, or the ability to change and adapt in response to experience and environmental factors[25]. This means that individuals can develop new skills and habits that promote positive thinking and improve mental health outcomes[25].

Overall, positive psychology, technology and neuroscience can play an important role in improving mental health and psychological well-being among university students. Positive psychology interventions can help individuals to focus on positive aspects of their personality, while technology can be used to deliver and monitor these interventions. Neuroscience research can inform the development of effective interventions that promote neuroplasticity and improve mental health outcomes.

5. CONCLUSION

This research study highlights the role of positive psychology, technology and neuroscience in shaping the mental health and psychological well-being of students in Jakarta. The results emphasize the beneficial effects of positive psychology therapies, such as character strength building and thankfulness exercises, on students' psychological wellbeing and life satisfaction. The study also revealed the detrimental effects of excessive social media usage on mental health and stressed the significance of encouraging students to utilize technology responsibly. The integration of neuroscience principles, particularly mindfulness practices, was found to improve students' emotion regulation, stress management, and overall well-being. These findings underscore the potential benefits of incorporating neuroscience approaches into educational programs to support students' mental health.

The findings of this research have important ramifications for Jakarta's educational institutions, policy officials, and mental health professionals. Schools may create happy learning

environments that enhance students' mental health and psychological well-being by including positive psychology treatments and encouraging responsible technology use. Moreover, the incorporation of neuroscience principles can improve students' ability to self-regulate and manage stress, which contributes to their overall well-being. However, it is important to acknowledge the limitations of this study. The sample size and specific context of Jakarta may limit the generalizability of these findings to other populations and environments. Future research should explore these factors in different cultural contexts and investigate the long-term effects of positive psychology interventions, technology use, and neuroscience approaches on students' mental health and well-being.

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