

Big Data Dilemma: The Psychological Impact on Adolescents

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Abstract. Big data, characterized by its vast volume, has revolutionized the landscape of information analytics across multiple domains. While recording digital footprints that users generate online, the big data learns the preferences of each user and thus can form precise user images, which helps marketing for major companies. By implementing content recommendation mechanism based on the big data, users, including a great number of adolescents, are constantly impacted by it. This research mainly investigates big data algorithms' influence on adolescent's psychological state. By examining big data's impact on adolescent's stress levels and cognitive growth, this study reveals both positive and negative effects on their psychological health, including increased engagement, improved social skill, alongside with potential risk of social media addiction, decreased self-confidence and higher level of anxiety. Improper usage can worsen psychological issues, while proper implementation allows early detection and intervention. This study integrates and summarizes current understanding big data and adolescent psychological health, discusses potential effects on adolescents and proposes future challenges with solutions.

Keywords: Big data; psychological health; adolescents.

1. Introduction

Today, big information formulas have ended up being the focus of spotlight. While the electronic change has brought extraordinary progression, it has also introduced an era where data-driven decision-making has actually become the norm. Created to procedure, examine and analyze huge amounts of details, big data play a crucial duty in shaping daily experiences, from tailored online material to predictive analytics across industries. Nonetheless, the influence of big data exceeds efficiency and convenience, touching the real textile of human psychology and practices, particularly amongst adolescents.

Adolescent's psychological health has long been a subject of interest yet has actually received enhanced focus in recent years because of the increasing prevalence of psychological illness in the whole population. The pressures of modern-day society, consisting of scholastic pressure, the impact of social media and the drive for success, are recognized as contributing aspects to the increasing occurrence of stress and anxiety, and other mental health problems amongst adolescents. Big data is a vital part of their lives, not only as a source of stress and anxiety, but also likewise as a device to intensify existing problems.

The relationship between huge information formulas and adolescent's psychological wellness is a multifaceted issue. Essentially, formulas are made to maximize customer involvement, typically at the expense of material that is mind-blowing, addicting or anxiety-provoking. Continuous direct exposure to thoroughly curated material that strengthens comparison and competition can result in feelings of inadequacy and enhanced tension degrees in adolescents. Additionally, the lack of personal privacy and data monitoring inherent in electronic systems can bring about sensations of being frequently checked, which can undermine adolescent's growth of freedom and self-esteem.

The goal of this paper is to check out the complex connection between big data and adolescent's psychological health. By analyzing the systems through which algorithms run and their prospective influence on adolescent's psychological advancement, this research looks for to recognize the wider social ramifications of these technical advancements. The study discovers exactly how big data can

add to and minimize the psychological health difficulties faced by the younger generation, and eventually objective to recommend methods for a much more balanced and moral use data-driven modern technologies in the context of adolescent's psychological wellness.

2. Big Data and Psychological Health

2.1. Definition

Psychological health is a state of mental well-being, equipping people to manage life's challenges, involves efficiently in discovering and work, and actively taking part in their neighbourhood's health. As an essential aspect of general health and wellness, it supports the capability to make informed selections, build significant links, and influence the society. Acknowledged as a basic human privilege, psychological health is critical to individual, neighbourhood and socio-economic development [1]. This state of well-being can be affected by numerous variables, including technical innovations and societal trends. In the digital age, psychological health is significantly intertwined with the prevalent presence of big data.

Big data describes the huge and vibrant pools of details that are created, collected, and assessed at an unmatched range and speed. It is characterized by its volume, variety, and speed, challenging conventional information processing techniques with its complexity and sheer size [2]. The effect of big data on psychological health and wellness is multifaceted, as it can both favourably and negatively affected the psychological health of individuals, specifically adolescents.

The influence of big data on adolescent psychological health is an area of expanding study interest, since it holds the potential to considerably impact the emotional growth and well-being of adolescents. Studies that have primarily conducted have largely focused on the general public. This research study delves much deeper right into the detail's implications for adolescents.

By conducting the research, this study intends to shed light on the details ways in which huge data influences the psychological health of adolescents, and to offer suggestions to make certain that the advantages of big data are realized without compromising the well-being of adolescents. Through a multidisciplinary method, this paper contributes to the interventions and support systems that can assist advertise psychological health among adolescents.

2.2. Role in Shaping Adolescents

Normally, the psychological wellness of adolescents is quickly influenced by peer interactions, academic stress, and self-identity. Nowadays, the advent of big data has intensified these impacts, adversely impacted adolescent's sense of truth and self-regard. Additionally, the big data formulas may limit adolescent's exposure to various ideas, therefore significantly impede their cognitive development. In contrast, if huge information is applied appropriately, it can be a valuable source of psychological health professionals, enabling them to find the adolescents that are risk to ensure that they can supply appropriate treatments and assist in adolescents' psychological development.

Nonetheless, the influence of big data is not restricted to content monitoring. Big data likewise shapes the perceptions and interactions of adolescents. On the one hand, individualized promotions can target rate of interests and affect their self-image, ultimately leading to the feeling of stress, anxiety and inadequacy. On the other hand, if big data can be used correctly, it can be critical in promoting the psychological health and wellness of adolescents. By assessing their search patterns and interactions with others, system can discover early indicators of depression to make sure that experts can offer aid to create a healthier atmosphere for adolescents.

Overall, the research of large data's effect on adolescent emotion is of vital importance that requires multidisciplinary study. By making use of large information analysis, researchers can look into the result on adolescent's psychological health and wellness and design targeted interventions that can minimize mental wellness threats and advertise the psychological wellness of adolescents.

2.3. Potential Effect on Adolescents

Social media amplifies the tendency to compare cultures with others to extreme degrees [3]. This trait increases the chances for adolescents to get access to contents from multiple cultures, where the users can view a wide range of information that potentially contains excitement, happiness, or sadness. However, for most users, especially adolescents, they are most likely to remember only the posts that contain the most fun or excitement [4]. As a result, adolescents may find themselves feeling stressful or anxious when using social media, since the most exciting information they see on social media is usually used to compare with themselves, which leads to the formation of anxiety and self-doubt. Interestingly, a study had shown that adolescents with the heaviest study burden showed preference of watching short videos, demonstrated in Figure 1 [5].

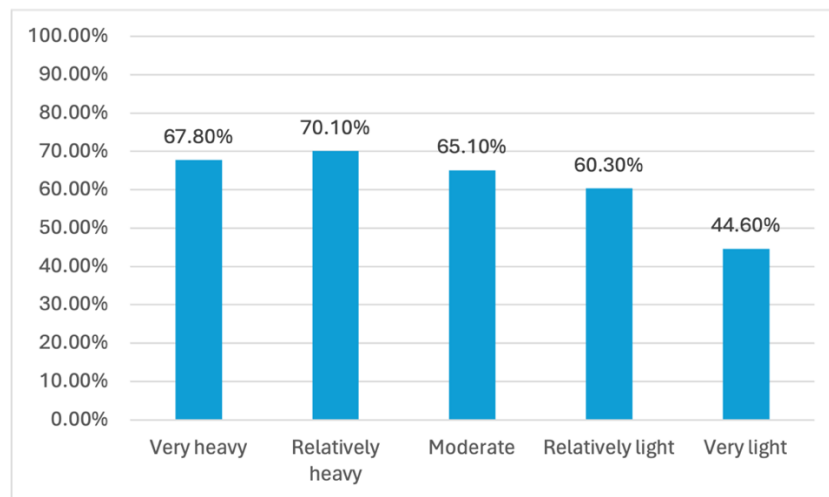


Fig. 1 The proportion of minors who have used short videos, broken down by different levels of study burden [5].

This is fairly reasonable for them to relief stress by using short videos or social medias, however the big data algorithms that are implemented in these platforms collect preferences of the users, to ensure users receive the largest amount of satisfaction while using them. This leads to the problem where adolescents are studied by the big data, and the big data keeps feeding them with fun and excitement, causing temporary satisfaction but huge stress and anxiety after a period of time. This explains the downfall of some famous social platforms like Facebook, which has a less personalized experience for each user, as shown in Figure 2 [6].

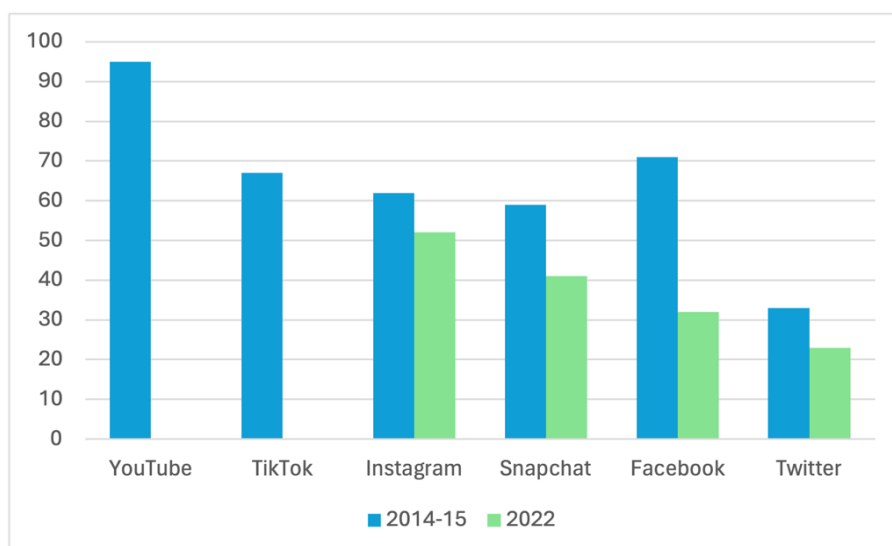


Fig. 2 Global share of adolescents who use major social media platforms in 2014-15 and 2022 [6].

Since adolescents usually have less ability than adults to control and adjust their psychological status, this can make them feel overwhelmed and even lead to some psychological illnesses [7]. One possible example is internet addiction, which will directly affect the study efficiency and social relationships of adolescents.

Another issue caused by big data is that it generates user-image which saves time for personalized recommendation, so the content shown would be highly relevant to one's preferences [8]. For adolescents, since their self-identities are not fully developed, they may get misled in regards of how the information they perceive affects and shapes their values and world views. By sending recommendations to adolescents age users, big data may skew the understanding of what is desirable for adolescents.

While the concerns regarding big data's impact on adolescent psychological health are valid, there are several aspects in which the big data can be helpful for adolescents age psychological health. Based on the special recommendation mechanism powered by the big data, educational resources can be easily found based on the user-image that platforms generated [9]. If one shows interest in one particular subject that is recognized and recorded by the big data, then he/she may receive relevant recommendations that are both personalized and educative.

What's more, since the big data also plays a crucial role in contemporary socializing activities that determines and categorizes people with similar interests, adolescents are able to discover and develop their interests with people from various regions and cultures, which can enhance their social skills and potentially improve psychological health, since their perspectives or views can be expressed and potentially be recognized by others on the Internet.

2.4. Future Challenges and Solutions

Alongside with the potentially significant impact of big data algorithms on the psychological health of adolescents, there are still a number of challenges to consider ensuring that the use of big data can be quantified and manipulated by regulatory institutions, that it will not further infringe adolescent privacy. A common issue is that adolescents under appropriate age to use various online platforms can have their own accounts without parents' consent, as the age verification mechanism for most platforms is easy for adolescents to bypass. This causes a great proportion of adolescents been exposed under the big data algorithms and thus shaped by potential hazardous information. What's more, most platforms allow content preview without logging in, meaning that current statistical user data of several major social media platforms are potentially unilateral that may demonstrate contents that are in favor of adults to adolescents, which can also cause harm to their mental health. Furthermore, as the big data keeps tracking and recording the digital footprints of individuals, adolescents are facing severe issue about their data privacy caused by algorithms. This is not only shown in social media platforms, but also in realms such as shopping sites that record the browsing history and preference of adolescents [10].

In order to address or alleviate these issues, essential measures need to be taken. For instance, a more advanced and strict age verification system needs to be implemented in all kinds of social medias to comply with local law that regulates the age requirement for usage. What's more, the content recommended to unverified users should be censored by platforms before demonstrated to prospective adolescent users. Finally, unverified or adolescent users' data should not be collected or only kept under supervision to ensure data privacy for adolescents.

3. Conclusion

This paper supplied an assessment of the varied influence of big data algorithms on the emotional wellness of adolescents. This research has found the systems through which big data shape adolescent's online experiences and their impacts on teenagers' innovation. The findings emphasize the twin nature of big data's impact, highlighting its prospective to both intensify and alleviate psychological wellness and wellness challenges. This research study has suggested a collection of

methods focused on utilize the beneficial elements of big data while lessening its negative consequences. These techniques include the development of moral requirements, attending to mathematical bias, improving personal privacy and security, advertising electronic health, and making sure reasonable accessibility to psychological health sources. It is essential that policymakers and designers' team up to perform these references, assuring that the benefits of huge information are used appropriately for the enhancement of teen emotional health.

This paper initially aimed to provide a comprehensive analyse from multiple perspectives, including identifying extraneous variables that may also lead to mental health problems of adolescents. For example, the "FoMO" (Fear of Missing Out) effect, can be used to explain the overuse of social media platforms as well. Due to deficiency of time, this paper is not thoroughly developed in which only several factors and reasons that contributes to the adolescent mental issues are examined and analysed, which could be a potential limitation.

Authors Contribution

All the authors contributed equally, and their names were listed in alphabetical order.

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