



Visualizing The Effect Of Frequency And Nature Of Social Media Platforms Usage On Mental Health And Family Functioning From An Ethnographic Point Of View

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ABSTRACT

Social media has become an integral part of our daily lives, with billions of users accessing these platforms mainly from their smartphones. Existing literature suggests that social media has an impact on mental health, but it is not clear whether this impact is positive or negative. This raises concerns about the relationship between social networks and public health, which require further investigation. In response, this doctoral consortium paper proposes a research study that investigates the impact of visualizing the frequency and nature of social media use on mental health and family functioning. The research study consists of two main user studies and four supporting surveys, aimed at reflecting on and adding to the existing literature. Furthermore, the study sampled participants from different ethnographic backgrounds, including the United Kingdom, Saudi Arabia, and Malaysia. This approach is beneficial because it allows cross-cultural comparisons, which can help identify similarities and differences in the impact of social media on mental health and family functioning across different cultures. It is important to examine the impact of social media on mental health and family functioning across cultures because social norms, values, and attitudes may differ between cultures, leading to different results. The analysis includes in-group comparisons between different cultures and gender, with an emphasis on identifying negative impacts. This research addresses a literature gap, providing evidence of the negative impact of social media on mental health and family functioning and the effectiveness of visualizing this effect.

CCS CONCEPTS

• **Human-centered computing** → **Collaborative and social computing**.

KEYWORDS

Visualization, Social Brain, Social media usage, Mental health, Family functioning

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1 MOTIVATION

This doctoral consortium paper proposes a research study investigating the impact of both the frequency and nature (type) of the use of social media platforms on users' mental health and family functioning, with a particular emphasis on in-group comparisons between different cultures and different gender. The proposed study seeks to address the literature gap by examining the effectiveness of visualizing the impact of social media on mental health and family functioning. Most studies focus on frequency or nature; however, this study examines both factors to provide a more comprehensive understanding of the relationship between social media usage and mental health and family functioning.

2 BACKGROUND AND RELATED WORK

With billions of users mainly accessing social media platforms through their smartphones, social media now has a significant impact on public health. However, the impact of social media on public health has become a growing concern [9]. Alarmingly, more than 450 million people worldwide suffer from mental or behavioral disorders [28], making it a pressing public health problem. Previous research suggests that social media has an impact on mental health, with positive and negative effects reported [12, 20, 29]. Young adults are the most affected population, as they are the most active users of social media [23]. Although positive effects include the promotion of mental health, knowledge sharing, and the use of social media to expand educational opportunities and social support [3], the adverse effects of problematic social media usage and smartphone usage are concerning, and have been linked to addictive and depressive symptoms [13], reduced psychological well-being [8], and sleep and mental health problems [15]. However, the impact of social media on family functioning has been largely overlooked in the literature, despite its critical role in the shaping of interpersonal relationships [16]. Most studies focus on the impact of social media on social connectedness [11]. The relationship between family functioning and mental health and developmental problems has been established in the literature, highlighting the need to further explore this relationship [17, 25].

Although some studies have investigated the effect of social media on people with individualistic cultural backgrounds [19], intercultural adaptation [22], and cultural values [1], others have

emphasized the effect of lifestyle and cultural resources on the use of social networks [6]. Some studies have focused on two cultures and studied the effect of social media in detail [4, 10], which is the approach considered in this paper. The United Kingdom, Saudi Arabia, and Malaysia have been selected as the focus of the study because they are considered countries with different characteristics. Given that these nations encompass a range of cultural circumstances, including distinct socioeconomic backgrounds, religious convictions, and levels of engagement with social media [14], it is worth noting that Saudi Arabia and Malaysia rank among the top 10 countries with the highest rates of social media adoption, as indicated by a report from Hootsuite and We Are Social [24]. In contrast, the United Kingdom exhibits a lower penetration rate, although it still boasts a considerable number of social media users [24]. By examining these three countries, we can identify both shared characteristics and disparities in social media usage, as well as its impact on mental well-being and family dynamics across diverse cultures. The impact of social media platform usage on mental health and family functioning across different cultures or cross-reference gender has not been explored in previous studies and is addressed in this research.

The researcher did not find studies that visualize the impact of the frequency and nature of social media use on mental health and family functioning, which is a critical gap that this research aims to fill. Previous studies have emphasized the importance of visualization for mental health as it can decrease depression symptoms and improve overall mental well-being. Furthermore, self-guided positive visualization techniques can combat negative thoughts and potentially alter the way the brain functions [27]. Visualization techniques can increase an individual's awareness and engagement, and trigger targeted behavior change based on the significant observations shown by visualization [2].

3 DESCRIPTION OF THE PROPOSED RESEARCH

The proposed research aims to investigate the impact of social media platform usage on mental health and family functioning. Four research questions have been identified. To achieve these research aims, a mixed-methods approach is used, which involves both quantitative and qualitative data collection methods with participants from different cultures and gender. The study's findings contribute to a better understanding of the relationship between social media platform usage and mental health and family functioning, as well as the potential benefits of the Social Brain Application (see Section 4 for more details) and visualizations in promoting awareness about its impact. Ultimately, the research aims to provide insights that can inform strategies for promoting healthy social media platform usage and mitigating its negative effects on mental health and family functioning.

3.1 RESEARCH QUESTIONS

The research question has been identified as:

- RQ1: How does the frequency and nature of social media platform usage impact mental health and family functioning?

- RQ2: Is there a difference in the effect of social media platform usage on mental health and family functioning across different cultures and gender?
- RQ3: Can the Social Brain Application be an effective tool for measuring the impact of social media platform usage frequency and nature on mental health and family functioning?
- RQ4: Does visualizing the impact of social media platform usage on mental health and family functioning increase awareness about its effects?

4 RESEARCH METHODOLOGY

Before commencing the study, an extensive literature review was conducted to gain a comprehensive understanding of the current state of knowledge on the impact of social media platform usage on mental health and family functioning. The literature review informed the study's conceptual framework and guided the development of research instruments. Ethical approval for all of the studies was obtained from the King's College London Ethics Committee. This section provides an overview of the research design and data collection methods. The tools used to collect data for each research question are described in detail, including the Social Brain Application and visualization techniques.

User preferences for building a mobile application survey. An online survey to detect user preference for designing a mobile application has been developed and deployed both in English and Arabic. The total number of participants for this survey was 563 and data from this survey was used to guide the design of the Social Brain application.

Social media classification survey. Another survey was used to classify social media according to user's preferences meaning whether it is text-based, image base, or both. With a total number of 91 participants. It has been developed and deployed both in English and Arabic. Data from the survey was used in the analysis of the Social Brain application data.

User preferences for visual data representation survey. The third survey was conducted to detect user preference for designing visual data representation with a total number of 63 participants. It has been developed and deployed both in English and Arabic. Data from this survey will be used to design the visualization study (see Section 7 for more details).

The Social Brain mobile application study. The Social Brain mobile application and website are created according to users' preferences, a total of 65 participants were recruited to participate in the Social Brain mobile application study, with the application and website available in Arabic, English, and Malay. The purpose of the application was to track users' social media platform usage, including frequency and nature, as well as their mental health status and family functioning states. The Social Brain application provided weekly feedback and included puzzles to increase user engagement. Following three months of use, participants were asked to complete an end-of-participation survey to gather feedback on the effectiveness of the application. Of the 65 participants, 60 completed the survey. To encourage participation, a draw of £200 Amazon vouchers was

divided equally across 10 participants. The analysis used qualitative and quantitative data collection methods, with self-reported data and tracked data [7, 21] combined. Due to the nature of the questionnaire, the data collection was run for three months, i.e., 90 days. Refer to Fig. 1 for more detailed information about the research methodology used in the study.

5 TOOLS

The General Health Questionnaire (GHQ12) [26] is used to determine the user’s mental health status, performed. The scoring of this questionnaire is performed according to the Likert Scale. The 12 questions scored from 0 to 3 for each item; the total score ranges from 0 to 36. Scores vary by the study population, scores about 11-12 are considered typical. A score above 15 indicates evidence of distress. A score above 20 suggests severe problems and psychological distress. GHQ12 questionnaire is performed weekly. The Family Assessment Device (FAD) is used to determine the user’s family functioning status. FAD is a 60-item self-reported scale designed to assess seven dimensions of family functioning based on the McMaster Model of Family Functioning [5]. A total of 12 questions from this scale which is performed upon the user download of the application and divided throughout a week for the assessment to take place weekly were presented to participants. Half of the questions are scored as healthy functioning items and the other half as unhealthy functioning items. To calculate the total result, an average of the total user scores is performed.

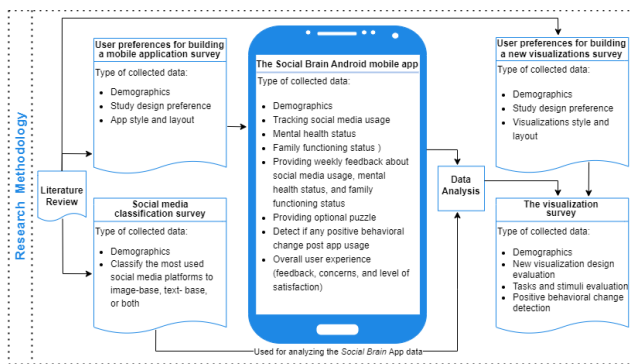


Figure 1: Research methodology used in the study

6 RESULTS AND CONTRIBUTIONS TO DATE

The Social Brain application is designed to provide users with a personalized assessment of their social media platform usage and its impact on mental health and family functioning. To create the application, user preferences were collected through a mobile application survey, and the collected data were used to inform the design of the Social Brain application. Data from the social media classification survey were also analyzed to provide context and insight into users’ social media behavior. The results tab of the Social Brain application (see Fig. 2) displays users’ weekly assessments through visualizations based on daily questions and social media usage tracking. The results are presented in three sections. The first section provides a breakdown of the top ten most used

applications, showing the details of users’ usage and offering the option to display results in either weekday or weekly layouts. The second section features a brain diagram that visually represents users’ mental health status, using color encoding to indicate different mental health statuses. Regardless of the results, users receive an explanation of their mental health status and links to certified mental health support organizations. The third and final section shows a family emoji to represent users’ family functioning status, an abstract emoji representation was used to avoid gender bias. Again, regardless of the results, users receive an explanation of their family functioning status and links to certified family support organizations. By providing personalized assessments through visualizations, the Social Brain application aims to promote greater awareness of the impact of social media platform usage on mental health and family functioning. Participation in the application was diverse, including users from different cultures and gender. Further analysis will be performed to accentuate the differences in results for different gender and cultures. Initial results indicate that time spent on social media when compared to mental health and family functioning is mostly negative. Further analysis will investigate whether text-based platforms have a worse effect on individuals than image-based platforms and detect further trends and correlations in the relationship between social media, mental health, and family functioning. Correlating the results of social media with mental health status and family functioning status and displaying them every week to participants shows promising indicators of triggering a positive behavioral change in participants. Further analysis will demonstrate the effectiveness of both the Social Brain application and the visual data representation displayed on the application.

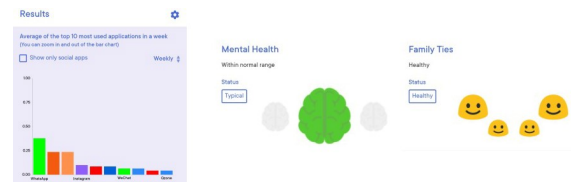


Figure 2: The Social Brain application’s results tab.

7 EXPECTED NEXT STEPS AND FUTURE WORK

The prior study results (visual data representation in the Social Brain application and the user preferences for the visual data representation survey) lay the groundwork for the forthcoming visualization study, which seeks to ascertain if visualizing the influence of social media platform usage on mental health and family functioning enhances awareness of its effects as presented in Fig. 1. The visualization study will use qualitative and quantitative data collection methods. The study will be conducted using Prolific [18]. By expanding on the results of the previous study, this visualization study aims to provide valuable insights into the most effective ways to present information about the impact of social media platform usage on mental health and family functioning. Ultimately, this

work will contribute to the development of evidence-based recommendations for the use of social media platforms, which can inform policy and practice in this rapidly evolving field.

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