Impact of Mobile Computing and Gamification toward Teenager's Characteristic Development and Personality: Proposed Framework

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ABSTRACT

This study explores the impact of mobile computing and gamification on teenagers characteristic development and personality. It aims to understand how the use of mobile devices and gamified experiences influences various aspects of teenagers' development, including their cognitive, emotional, social, and academic domains. The study considers the influence of mobile computing and gamification on personality traits such as creativity, curiosity, and risk-taking behavior, as well as their impact on critical thinking skills, problem-solving abilities, and information processing. Additionally, it examines the relationship between mobile computing, gamification, and teenagers' social behavior, online interactions, and digital citizenship. The study also addresses potential risks and challenges associated with these technologies, including cyberbullying, privacy concerns, and excessive screen time. Furthermore, the study explores the role of parental guidance and family dynamics in shaping teenagers' technology use and engagement with gamification. Ethical considerations and implications are also discussed, including privacy, data security, and equity. By providing a comprehensive understanding of the impact of mobile computing and gamification on teenager characteristic development and personality, this study aims to inform strategies for promoting healthy and beneficial technology use among teenagers.

Keywords: Mobile computing; Gamification; Teenagers; Characteristic development; Personality; Learning outcomes; Academic performance; Social behavior

INTRODUCTION

Demand and addiction are increasing among today's gamers and internet users (Masaeli and Farhadi, 2021). Since we live in a technological era, more and more kids are playing video games online. Globally, digital gaming is growing in popularity (Sanjaya et al. 2023). Teenagers and their relationships with their families are harmed by the negative impact, which has many adverse consequences. Instead of engaging in conventional playground and street activities, teenagers today play online and digital games, and their addiction to these forms of gaming is growing and being used impulsively and excessively.

Originating in the computer gaming business, gamification employs game features outside of games to solve problems, maintain engagement, and influence behavior (Prasad, 2021). Gamification primarily appeals to basic human desires including success, competitiveness, acknowledgment, and self-expression (Zhao, 2024). Gamification is swiftly moving from games to the workplace (Sharma, 2023).

Understanding how gamification incorporates game design, game thinking, and game mechanics to improve non-game settings may be gained by examining educational practices and the courses that institutions provide (Luo, 2022). Adolescents' cognitive development may be enhanced by gamification, which primarily uses game elements to make circumstances better (Antonopoulou et al. 2022).

The current digital era, teens excessive mobile phone usage is becoming a significant worry (Nakshine et al, 2022). Teenagers' easy access to mobile computing devices has led to an increase in the amount of time they

spend on their phones, which may negatively impact their development and general well-being (Girela-Serrano et al., 2024).

Teens' development and well-being are seriously at danger due to their inability to control their use of mobile devices and gamification (Sala et al., 2024). They are often tempted to participate in these activities excessively and impulsively as smartphones and gamified applications.

The purpose of this study is to investigate how teens' social behavior including their use of social media, online interactions, and digital citizenship relates to mobile computing and gamification.

Problem Statements

Teenagers' personality development and day-to-day life are greatly impacted by the growing influence of mobile computing and gamification (Li et al. 2022). Teenagers are continuously using digital tools for communication, education, and enjoyment because to the widespread availability of smartphones and tablets (Ricoy and Martinez, 2021). While there are obvious advantages to these devices, there are also worries about how they may affect social interactions, academic achievement, and mental health.

Education, healthcare, social media, gamification, and the application of game-like elements in non-gaming contexts is growing in popularity. It boosts motivation and engagement but may also promote characteristics like self-promotion, risk-taking, and competition (Wulan et al., 2024).

Overuse of mobile devices may result in addiction, anxiety, and poor self-esteem (Edwards et al. 2022). Many teens have trouble controlling their screen time and juggling digital activities with other obligations because they lack self-regulation (George et al., 2023). Their capacity to focus in class, their mental stability, and their physical health may all be negatively impacted by a lack of control (Kliziene et al. 2021). Teens find it more difficult to concentrate and do well academically when they are constantly distracted by mobile applications and games (Joshi et al., 2023). In order to assist teens general growth in a digital environment and help them form better technological habits, it is imperative that these concerns be understood.

Teenagers digital activity is greatly influenced by outside variables such peer pressure, family dynamics, and educational settings (Li et al. 2025). While family ties and parental supervision dictate how responsibly these devices are used, peer groups often establish social norms around technology usage, promoting engagement in social media or online gaming (Huda et al. 2017). Teens may develop problematic use behaviors that hinder their academic and personal development if they don't have enough support networks.

Gamification psychological effects may influence decision-making and intrinsic motivation (Zourmpakis et al., 2023). Instead of encouraging true self-discipline and resilience, gamified platforms may increase reliance on outside validation, even while they increase engagement via prizes and recognition (Ramzan et al., 2025). Teenagers may have long-term difficulties when they enter adulthood as a result of this dependence, which may restrict their ability to develop autonomy and well-rounded personality qualities.

There are benefits and drawbacks to gamification and mobile computing in the classroom. The resources may enhance critical thinking, active engagement, and learning outcomes. However, a lack of digital literacy, restricted access to technology in the classroom, and inconsistent use of gamified learning techniques might all contribute to a wider disparity in educational fairness. These differences underline the pressing need to look into how gamification and mobile computing affect teens personality development, academic achievement, and general well-being in order to create methods that balance risks and advantages.

This study offers a theoretical framework that incorporates the impact of gamification, mobile computing, and outside variables including peer and family contexts on teens' motivation, engagement, and learning efficacy in light of these relevant concerns. Examining how these social and technical factors interact to influence personality development, academic achievement, and general well-being is made easier with the help of this framework. The suggested framework will guarantee that the research is based on accepted theories and ideas by acting as a guide for methodically identifying important factors, investigating their correlations, and coming

to insightful findings. framework for systematically assessing the advantages and disadvantages of technology usage, which eventually helps develop well-rounded policies that optimize learning results while reducing possible hazards for teens in the digital age.

Research Framework

The theoretical framework illustrated in Figure 1 designed based on the literature examined and analyzed in determining the teenager personality towards factor that influences teenager behavior, impact of teenager behavior, and influences teenager behavior in learning outcome and academic performance. The variables used for this study are dependent and independent variables, which are the analytical factors assigned as dependent variable in determining the independent variables. Referring to Figure 1, the hypotheses developed for this study are based on the research questions and research objectives.

Proposed Theoretical Framework

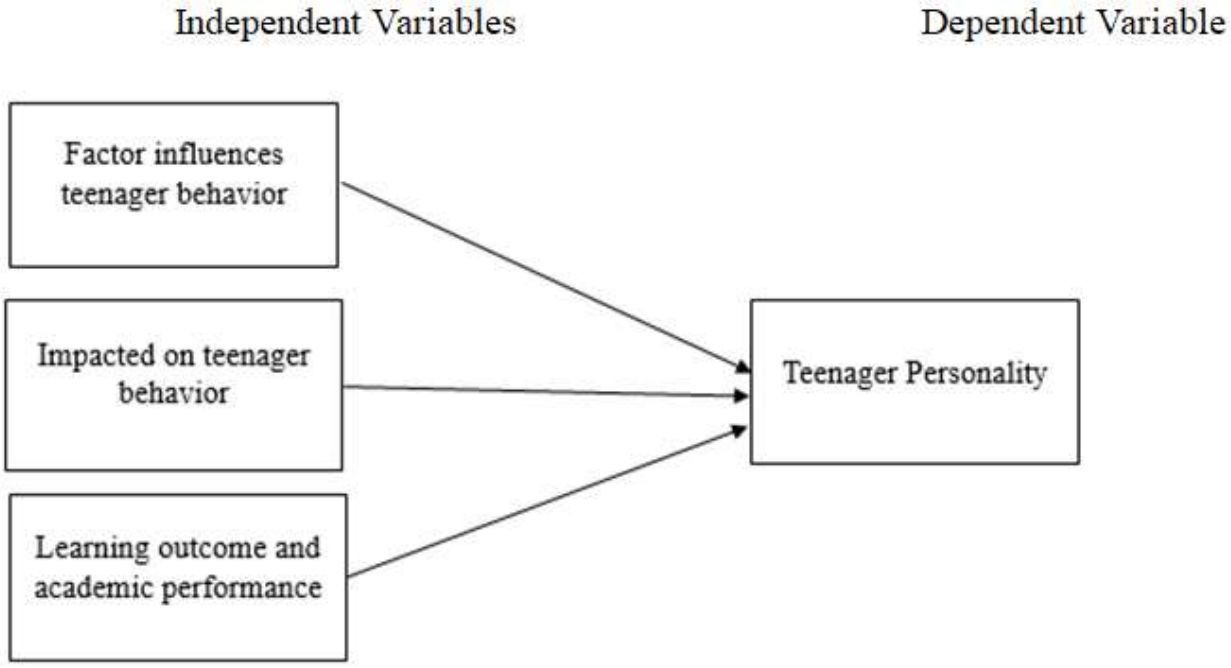

Figure 1 Theoretical Framework

Hypotheses Development

Based on the research objectives and conceptual relationship between the variables, the following hypotheses are examined and tested in this study:

Relationship between the factor influence teenager behavior in using mobile computing & gamification with teenager personality.

Teens surroundings by including their family, friends, school, neighborhood, media, technology, and cultural norms to have an impact on how they behave (Vickery, 2012). Their health, motivation, and attitudes are directly impacted by a number of factors, including parental practices, peer pressure, teacher-student connections, socioeconomic position, and social values (Sumanasekera et al. 2021). Knowing these aids in creating gamification and mobile computing methods that provide favorable results.

Teenagers strive for social acceptance and a feeling of community, peer influence becomes more significant (Laursen and Veenstra, 2021). Teenagers choices, hobbies, and participation in certain behaviors are just a few of the ways to their peers might influence their life. Study has shown how influential peers may be throughout adolescence like teenagers views, actions, and social conventions are greatly influenced by their peers (Giletta

et al. 2021). Teenagers decisions, actions, and involvement in a variety of behaviors, such as using mobile devices and engaging in gamification, might be influenced by their peers and peer groups.

Teens behavior, particularly their use of mobile devices and gamification, is greatly influenced by their family dynamics. Teenagers' attitudes, beliefs, and actions about technology are directly influenced by the relationships within the family, including those between parents and siblings (Tammisalo and Rotkirch, 2022). Teens are more likely to use technology responsibly and sensibly when they get support and encouragement from their parents and siblings (Akter et al. 2022).

Setting screen time limitations, having conversations about acceptable online conduct, and participating in cooperative activities use gamification and mobile computing are all examples of parental support. Teens who get parental participation and support are better able to make educated judgments regarding their use of technology and cultivate a positive connection with it (Indrajaya et al., 2024). Terms of psychology, it supports self-determination needs (relatedness, competence, and autonomy), enhances cognitive and emotional engagement through storytelling and interactive experiences, and increases intrinsic motivation through rewards and progress tracking (Lamprinou and Paraskeva, 2015).

Number of elements are involved in the psychological aspects of adolescent behavior when it comes to gamification. By include features like awards, prizes, and progress monitoring, for example, gamification may leverage teens innate desire and encourage their participation and perseverance in gamified activities (Ahad et al., 2025). When teens participate in gamified activities, these factors together influence their motivation, attitudes, and conduct.

Teenagers thought processes, which are greatly influenced by their interactions with digital devices, are another element. Teenagers use mobile computers and gamification to make decisions and solve problems creatively, which promotes goal-oriented behavior, problem-solving, and critical thinking (Ferraz et al., 2024). Teenagers may participate in problem-solving exercises and cultivate critical thinking abilities using mobile computing and gamification (Nazneen, 2024). In order to overcome obstacles or accomplish goals, players of games and gamified apps often need to assess conditions, make choices, and come up with original solutions (Samala et al., 2024).

Teenagers comparison of their accomplishments with those of their classmates influences their self-perception and reinforces their digital habits, therefore social influence also plays a part (Fathurohman et al., 2023). These procedures demonstrate how social forces and cognitive styles interact to influence how teenagers utilize technology and grow as individuals.

Since technology usage and gamified platforms may both help and hurt well-being, physical health is also a crucial factor. Positively, gamification is used by wearable technology and fitness applications to promote exercise, good habits, and lifestyle enhancements (Spil et al. 2017). Sedentary digital engagement and extended screen time might decrease physical activity, which can result in problems such weariness, obesity, and decreased endurance (Nakshine et al. 2022). Therefore, it is crucial to strike a balance between digital and physical activities to make sure that gamification and mobile computing support both mental and physical growth (Ali et al., 2024).

Therefore, this study proposes the following hypothesis:

H1: There is a positively significant relationship between the factor influence teenager behavior in using mobile computing & gamification with teenager personality.

Relationship between impact on teenager behavior in using mobile computing and gamification with teenager personality.

The usage of mobile computers by teenagers might have both beneficial and negative effects on system performance. While technologies such as cloudlets, compute offloading, and mobile edge computing might increase productivity, lower latency, and improve user happiness, immature programs may create disruptions

(Jiang et al. 2021). Through peer approval and acknowledgment, performance enhancements may influence teens' social relationships and increase their motivation, self-confidence, and engagement in gamified learning (Zainuddin, 2018).

Excessive focus on performance may result in stuck attitudes, stress, over competitiveness, and disregard of other aspects of life. For physical well-being, a balanced strategy that prioritizes both performance and holistic development is essential (Saleh and Shahidan, 2023). Teens may neglect other crucial aspects of their lives, like social interactions, physical activity, and academic obligations, if they become overly engrossed in mobile computing and gamification, particularly if their main goal is to achieve high scores or rankings (Gkitoni et al., 2024). Relationships, physical health, and academic achievement are just a few of the areas of their life where this may cause imbalances and detrimental effects.

Self-efficacy, problem-solving skills, and critical thinking may all be enhanced by gamification and mobile computing-enabled effective learning experiences. Technologies promote more engagement and perseverance in academic assignments by including interactive activities, real-time feedback, and collaborative features (Sabri et al. 2024). Characteristics like resilience, flexibility, and intrinsic drive are formed in such supportive learning contexts, which also improve academic results.

Positive attitudes and self-efficacy may be developed as a result of effective learning (Getenet et al., 2024). Teenagers' confidence and conviction in their own skills are increased when they achieve success, mastery, and acknowledgment in their educational pursuits (Zhang and Qian, 2024). They may be more ready to take on challenges, persevere in the face of adversity, and seek out further learning opportunities as a result of their enhanced self-efficacy.

Encouraging cooperation, communication, and teamwork, learning settings may foster effective learning and pleasant social interactions and collaboration (Huang and Lajoie, 2023). Teens have the chance to interact with their peers, share ideas, and gain knowledge from one another, all of which may improve their social skills, empathy, and capacity to collaborate well with people from different backgrounds (Shvets et al. 2020). The quality of learning experiences has a significant impact on how teens behave, it is important to remember.

Thus, the following hypotheses is proposed for this study:

H_2: There is a positively significant relationship between impact on teenager behavior in using mobile computing and gamification with teenager personality

Relationship between the influences of teenager in learning outcome and academic performance with teenager personality.

Academic performance, as measured by grades, test scores, and assessments, shows students' overall accomplishment, while learning outcomes indicate the information, abilities, and attitudes that students should gain (Lampropoulos, 2024). Both are important predictors of academic achievement and prospects for the future.

Providing access to educational materials, individualized learning, and interactive experiences, mobile computing and gamification may improve these results by boosting motivation, engagement, and active involvement (Pechenkina et al. 2017). When used properly, they provide an engaging and dynamic learning environment that encourages self-directed learning, curiosity, and intrinsic motivation (Slamet et al., 2024).

The effectiveness of gamified and mobile-based learning is largely dependent on student involvement and engagement. In digital learning environments, teens that feel autonomy, teamwork, and acknowledgment are more likely to be curious, responsible, and eager to take on difficulties (Li et al., 2025).

Gamification is the introduction of game-based components like leaderboards, challenges, and awards that promote perseverance and constant effort (Thurairasu, 2022). According to Hellin et al. (2023), gamified

learning environments enable students to identify their strengths and fix their deficiencies in real time by offering instant feedback and visual progress monitoring.

Teamwork, peer engagement, and shared learning experiences are encouraged by the collaborative and social aspects of mobile computing and gamified platforms (Slamet, 2024). A more dynamic and interactive learning environment is produced when students are encouraged to participate actively, express their opinions, and learn from their peers via collaboration and group activities (Qureshi et al., 2023). Additionally, gamification and mobile computing provide tailored and flexible learning experiences (Manoharan and Nagulapplly, 2024). Students may pick activities that suit their interests and preferences, personalize their learning routes, and advance at their own speed.

Students gain communication, empathy, and problem-solving abilities by participating in cooperative challenges and online communities (Wang and Wu, 2022). Students find the learning process more relevant and engaging when real-world events and problem-solving are included into gamified learning sessions. By showcasing the real-world uses of what students are learning, individuals may increase engagement by applying their knowledge and abilities in realistic circumstances (Nazneen, 2024).

These encounters foster social maturity and personal development in addition to improving intellectual achievement. These advantages may be limited by disparities in digital literacy and access to technology, which emphasizes the need of inclusive methods to provide fair learning opportunities for all youths.

Therefore, based on the discussion, a hypothesis is proposed as follows:

H_3: There is a significant relationship between the influences of teenager in learning outcome and academic performance with teenager personality.

CONCLUSION

This research discovered that although environmental, psychological, and physical variables had minimal effect on personality, gamification and mobile computing had a beneficial impact on teens' motivation, engagement, and learning effectiveness. Students were kept engaged by gamification features like challenges and prizes, and learning was made more flexible by mobile computing. The research comes to the conclusion that, when used responsibly and under the right supervision, these technologies may enhance academic achievement, social engagement, and personal development despite potential hazards including misuse and distraction.

Declaration

We declare that this manuscript is our original work and has not been submitted or published in any other journal. All authors have contributed significantly to the conception and completion of this study.

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