

EXPLORING THE SOCIAL DYNAMICS OF PAKISTANI ADOLESCENTS IN THE METAVERSE: OPPORTUNITIES, CHALLENGES, AND PSYCHOLOGICAL IMPACTS

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ABSTRACT

With the rapid growth of the Metaverse and ongoing debates about its potential detrimental effects, adolescents in Pakistan face an influx of digital information without laws, regulations, or frameworks to filter content and assimilate it healthily and mindfully. This study contributes novel insights to the limited body of literature on adolescents' experiences in the Metaverse, addressing a critical gap in understanding their unique interactions. It focuses on the role of metaverse social interactions in their wellbeing, by exploring aspects of these interactions they find valuable or deleterious. Through convenient sampling, 38 Pakistani adolescents were selected who participated in five separate focus group discussions. Thematic analysis of the transcribed data identified two main themes: (1) Interpersonal Connectivity and Support, which encapsulates the ways individuals form, maintain, and experience relationships and emotional bonds within the metaverse; (2) Impact of the Metaverse Social Interactions, which reflects on the diverse positive and adverse ways the metaverse impacts their wellbeing. The current analysis reveals these interactions significantly influence their perceived sense of social presence, trust, and belongingness, while also affecting their physical, cognitive, spiritual, and emotional well-being. The support systems within the metaverse play a crucial role in their personal agency and autonomy, underscoring the importance of mutual respect and emotional support. The findings also highlight potential risks of psychological distress and maladaptive behaviors, emphasizing the need for balanced and mindful engagement with the metaverse. This study underscores how researchers, mental health professionals, and policymakers can leverage the metaverse to access teenagers and design targeted interventions, thereby facilitating positive well-being through their frequent social interactions.

Keywords: *Metaverse Social Interactions; Adolescent Wellbeing; Reflexive Thematic Analysis*

INTRODUCTION

Adolescents today engage with the digital world in multiple, immersive ways that extend beyond traditional online platforms. Social media, video games, and the metaverse provide diverse spaces for social interaction, entertainment, and identity exploration. A key characteristic of adolescent digital engagement is their ability to seamlessly switch between different platforms, using various

digital tools to maintain social relationships and express themselves. Statistical trends indicate a significant rise in digital usage among Pakistani adolescents, with recent data showing a steady increase in internet penetration and engagement with immersive social online environments, including the metaverse (PTA, 2023). Many adolescents use online platforms to form and

maintain friendships, seeking validation and community in spaces that offer both anonymity and visibility (Boyd, 2014). As Pakistani adolescents adapt to these environments, it becomes crucial to explore the dynamic evolution of their digital spaces with the unique psychological and developmental vulnerabilities of this age group. Previous studies have shown that these digital environments can foster social support and reduce feelings of loneliness, particularly for adolescents who may face barriers in their physical environment, providing individuals with spaces to interact and form connections despite geographical barriers (Vasalou et al., 2008). A study by Valkenburg and Peter (2009) further emphasizes that online communities can provide social support and contribute to adolescents' well-being. Adolescents, known for their heightened digital fluency, have been the fastest adopters of the new immersive technologies (Benvenuti et al., 2023). Their digital lives now extend beyond conventional social media platforms, into immersive virtual worlds that offer unprecedented forms of interaction, identity experimentation, and community building (Oh et al., 2023). Unlike traditional social media or gaming platforms, the metaverse offers immersive 3D environments that provide real-time, multisensory experiences, which can deeply affect users' social presence and identity formation (Dwivedi et al., 2022). Adolescents are drawn to the creative freedom that the metaverse allows for more complex social dynamics, such as the creation of avatars, which enable users to experiment with different aspects of identity in ways that 2D platforms do not (Oh et al., 2023). Moreover, the anonymity and psychological safety provided in the metaverse encourage more vulnerable individuals, such as those with social anxiety, to engage in social interactions they might avoid in real life (Caplan, 2006). The real-time, live-streaming capabilities, combined with its continuous and synchronous nature, allow for interactions that mimic real-world scenarios more closely than static or asynchronous digital platforms (Hennig et al., 2023). It offers adolescents a novel, expansive space where geographical and physical limitations dissolve, allowing them to socialize across the globe. Thus as an immersive extension of existing digital

platforms, the metaverse allows adolescents to curate dynamic digital avatar identities, interact in real-time, and participate in both recreational and social activities, facilitating a sense of presence and belonging (Oh et al., 2023).

While these interactions can be enriching and empowering, they also present unique developmental challenges. Adolescence, being the most critical time for identity formation, self-esteem development, and peer relationship building (Tarrant, 2002), is also marked by heightened sensitivity to social feedback and a strong desire for acceptance, making the nature of their social interactions deeply impactful. Erikson's theory of psychosocial development highlights adolescence as a critical period for identity formation, peer relationships, and self-esteem development (Erikson, 1968). The immersive and sometimes anonymous nature of the metaverse can either foster positive peer relationships and provide a sense of belonging or lead to negative outcomes like cyberbullying, digital addiction, social isolation, and mental health struggles (Caplan, 2006; Dwivedi et al., 2022). It also presents risks of identity confusion, especially when adolescents use virtual identities to experiment with aspects of themselves that may be different from their real-world identity (Dwivedi et al., 2022). As digital natives, adolescents tend to favor spaces like the metaverse that allow for creativity and self-expression, often curating online personas and social content that reflect their desired self-image. Adolescents, often driven by the desire for social acceptance, may curate idealized online personas that affect their self-esteem and mental health, either positively or negatively (Amichai-Hamburger & Vinitzky, 2010). Adolescents are particularly vulnerable to the metaverse's dual nature, where the lines between virtual and real-world identities blur, creating complex challenges for emotional regulation and mental well-being (Dwivedi et al., 2022). Research also suggests that limited social interactions or adverse experiences in digital spaces can foster loneliness, resultantly negatively impacting their wellbeing (Primack et al., 2017). Additionally, whilst immersive platforms provide opportunities for positive engagement and skill development, they can also lead to negative

outcomes like excessive screen time and emotional detachment from real-world social settings (Kuss et al., 2014). Thus, exploring how these digital interactions influence their social engagement, identity development, and mental health is crucial in understanding the broader implications of the metaverse on this sensitive age group.

In addition to these individual psychological dynamics, Bronfenbrenner's ecological systems theory offers a broader framework for understanding how various social contexts, from family and peers to broader cultural and societal forces, interact to shape adolescent development in digital spaces (Bronfenbrenner, 1979). In Pakistan, cultural norms emphasizing collectivism, family values, and adherence to traditional social structures shape how adolescents engage with digital spaces, including the metaverse. Adolescents often navigate the tension between liberal, modern virtual environments and conservative societal expectations, impacting their identity exploration and social interactions (Tanveer et al., 2023). This tension is further complicated by the lack of comprehensive digital laws and regulations in Pakistan, especially concerning privacy and online safety, leaving adolescents vulnerable to risks like cyberbullying, exploitation, and harmful content (Din et al., 2023). Despite these challenges, Pakistani adolescents increasingly rely on digital platforms for social interaction and as a primary source for verifying real-world events and information (Safdar, 2022). The pressure of adhering to social trends drives this reliance, with adolescents cross-checking news, trends, and even educational content online (Abbasi & Huang, 2020). This growing reliance, driven by growing smartphone accessibility and social media use, underscores the need to investigate how these adolescents engage with immersive digital environments, particularly within a cultural context that places high value on family structures and collective norms (Safdar, 2022). Without comprehensive digital literacy and safety regulations, Pakistani adolescents are vulnerable to cyber risks, such as exploitation and unfiltered content, making it essential to study how they adapt to and experience these digital spaces like the metaverse. Within this cultural and regulatory landscape, adolescent digital behavior

suggests a need to explore the implications of heavy reliance on and trust in digital spaces for their critical thinking and information literacy.

This study addresses the intersection of an immersive digital environment with a unique socio-cultural context where legal frameworks around digital safety are underdeveloped (Rehman et al., 2022). It addresses a critical gap in the literature by examining how Pakistani adolescents navigate social interactions in the metaverse, particularly in the context of identity formation, self-esteem, and overall well-being. By exploring the specific affordances of the metaverse, such as anonymity and the ability to disengage from overwhelming social stimuli, this research will highlight factors that contribute to adolescents' perceived psychological safety (Misoch, 2015). Adolescents struggling with social anxiety or low self-esteem may find these features particularly appealing, as they allow for controlled social experimentation without the pressures of face-to-face interactions (Caplan, 2006). By exploring these dynamics through a qualitative lens, this research provides valuable insights into the complexities of social interactions in digital spaces, offering a foundation for future quantitative studies aimed at generalizing these findings to broader populations. The focus of this study is to address the critical theoretical gap in understanding how adolescents socialize in the metaverse, with practical implications for promoting healthier digital habits, ensuring mental well-being, and guiding policy on digital engagement in Pakistan. This nuanced understanding of their experiences will highlight both opportunities and challenges for their social development and psychological health, offering insights into the creation of targeted interventions to foster resilience in the face of potential digital threats.

Method

Research Design

The present study employs a qualitative approach, with data gathered through Focus Group Discussions (FGDs) and analyzed using thematic analysis.

Participants

A total of 38 teenagers participated in the five focus group discussions. Each FGD consisted of an appropriate ratio of both genders and the group size ranged from 5-9 participants. Female participants had a higher ratio (53%) whereas male participants (47%) were slightly less (N= 38, Male n=18, Female n=20). The median age was 16 and a half years (range 14 to 19 years), with a median of 14 months of experience in the metaverse (range 10 to 18 months). The primary inclusion criteria required individual to be between the ages of 14 and 19 years old, who were familiar with the metaverse applications and had been interacting in it for a minimum period of six months. The participants belonged from diverse socio-economic backgrounds from across Rawalpindi and Islamabad, nevertheless, all were well accustomed with interacting in the metaverse.

Focus Group Guide

The focus group guide, a brief manual with FDG protocols and a questions guide, was developed prior to recruiting the participants for the discussions. The purpose of this guide was to develop a transparent and comprehensive approach to the research practices, facilitate the organization and administration of the FGDs, and ensure they conformed with the scope and objectives of the research. The study followed a hybrid method of deductive and inductive research method. Thus the questions guide was developed after rigorous theoretical research that circumscribed the concepts of social interactions, both in person and online, and the metaverse experiences especially in the context of adolescent usage and indigenous perspectives. The open-ended questions developed were pre-tested with fellow research students to ensure they were not leading or overwhelming, and that they were in line with the research questions that needed to be addressed through an inductive process. It included open-ended questions, 5 broad questions, 26 specific and probing questions that were designed specifically to invite participants to express freely. The FGD guide was a living document that was updated after insights from each FGD was gathered.

The focus group guide contained four broad questions (a) What kind of interactions do you

experience in the metaverse? (b) What is important in your metaverse social interactions? (c) What would make an interaction valuable or harmful? (d) How are these interactions different from other digital platforms (e) How are these interactions affecting you or your peers? These questioned were designed to set the scene for more specific questions, followed with probing questions to find out contextual details of the responses. The specific questions related to identity exploration, interests, motivation, decision-making, autonomy, social support, peer influence, barriers, psychological impacts, well-being, values, and cultural norms with reference to adolescents' engagement in the metaverse were addressed. Identity exploration questions sought to uncover how adolescents perceive and experiment with their identities in virtual spaces. Questions related to interests and motivation aimed to explore what drives adolescents to participate in the metaverse and how these digital environments cater to their personal preferences. Decision-making and autonomy were examined through questions about how adolescents navigate social dynamics and make choices within the metaverse. Social support and peer influence questions focused on the nature of online relationships and how peer interactions impact their metaverse experience. Barriers and challenges were addressed through questions exploring concerns like online safety, cyberbullying, and the cultural and regulatory limitations specific to Pakistan. Additionally, questions related to psychological impacts and well-being examined how participation in the metaverse affects adolescents' self-esteem, satisfaction, burnout, and overall mental health. Finally, questions addressing values and cultural norms explored how adolescents reconcile the liberal, modern virtual environments with conservative societal expectations, particularly in how this influences their identity and social interactions.

Procedure

The study received approval from the Advanced Studies Research Board, and permission was obtained from relevant authorities. Participants were selected and recruited through a convenience sampling method. The study's purpose was

explained to the participants, and confidentiality was assured. The FGDs were initiated with formal consent taken from the parents and the teenage participants themselves as well, in addition to a brief overview of the purpose of the discussions. Each focus group session commenced with a broad, open-ended question, followed by more specific probing questions as outlined in the discussion guide. With participants' consent, the sessions were audio-recorded.

The FGDs were conducted by a team consisting of a moderator and an assistant moderator, both previously unknown to the participants. For each FGD notes were taken down by the researcher and the assistant moderator in the FGD guide (protocol notebook). Each 90-minute FGD was structured with initial 10 minutes of introductions and then 65 minutes of the main discussion. The participants were given space and opportunities to informally share their metaverse experiences. In the last 15 minutes, participants were allowed to further add to the discussion. A series of FGDs were conducted till saturation in the emerging themes was achieved. Several themes arose consistently in the four focus group discussions. The fifth focus group was conducted to confirm that data saturation had been reached and that the emerging themes were comprehensively described. The data obtained was transcribed, coded, and analyzed using Braun and Clarke's Reflexive thematic analysis approach.

Ethical Consideration

The research strictly followed ethical considerations at every stage of the study. Starting from the development of the guide, which included standardised protocols and a questions guide that was developed with consideration to ensure cultural, age, and gender sensitivities. The FGD protocols were designed to organize and run each of the discussions with coherence and following the same procedure. It also included the structure and management of the processes within an ethical framework. The researcher took parental approval prior to approaching the participants at every stage of the data collection. Ethical consent and procedures to ensure the safety and confidentiality of the participants were taken into account before initiating the data collection. The participants were given a formal introduction to the researcher and

were informed about the purpose and objectives of the study. The researcher acquired informed consent from the participants before administering the questionnaires, and they were assured that their participation was voluntary, giving them the right to leave the study whenever they wanted. Assurance regarding the confidentiality of the data was also emphasized along with the usage of the data collected and analysed.

Data Management and Transcription

The first step involved creating detailed transcriptions of the focus group discussions immediately after they were conducted. These transcriptions focused on relevant extracts that provided insights into participants' experiences with metaverse social interactions. The verbatim transcripts of the focus group discussions were verified for accuracy by comparing them with the audio recordings. The participants were presented with a printed summary of the initially generated themes that emerged in their discussion for validation, and no corrections or additional themes were identified by them.

Data Analysis Process Through Reflexive Thematic Analysis

The data analysis aimed to uncover significant patterns from focus group discussions using Reflexive Thematic Analysis (RTA), inspired by Braun and Clarke (2006). This six-phase method facilitated the identification of themes and sub-themes, capturing the essence of participants' experiences. A hybrid approach, combining both inductive and deductive methods, was employed to systematically code the data and develop themes. The data analysis process was approached with a broad yet rigorous theoretical framework and conceptualized with creativity as central to the process. Through a continuous process and flexible engagement with the transcriptions, Braun and Clarke's six-phase reflexive thematic analysis was used to analyze the data.

1. Familiarization with the Dataset

The researcher immersed themselves in the dataset by reading and re-reading the transcriptions, balancing close engagement with the data and critical distancing to capture the diverse meanings

and emerging questions. Reflexivity played a key role, allowing the researcher to remain open to new insights without jumping to conclusions.

2. Coding

Systematically coding began with raw semantic codes that made sense of the diverse content. A total of 124 codes were further refined through multiple rounds of analysis, resulting in a concise and insightful codebook. The coding process balanced both a priori and emergent codes, capturing the participants' expressed meanings while remaining reflexive to avoid personal biases, resultantly 85 codes were finalized.

3. Generating Initial Themes

The initial themes were generated by actively engaging with the dataset and the codes, seeking conceptual patterns. This process involved organizing related codes into potential themes, ensuring they were supported by evidence and not just the researcher's interpretation. Eight initial themes were identified, each linked to 60 sub-themes, and a thematic map was created to visualize the interconnections.

4. Developing and Reviewing Themes

Through a recursive process and ensuring each theme had coherent meaning and addressed a broader concept than the initial codes, eight overarching themes, perceived value of interpersonal aspects, sense of support, sense of connection, sense of agency and control, psychological benefits, physical benefits, impact on cognitions, spiritual benefits of metaverse social interactions, encapsulating a broader concept that anchored twenty-seven sub-themes in total. These themes were further assessed and recognized as still being interconnected, therefore, a broader theme of interconnectivity and support was given to the themes of perceived value of interpersonal aspects, sense of support, sense of connection, sense of agency, and control which had clear boundaries and no overlaps. Similarly, the psychological benefits, physical benefits, impact on cognitions, and spiritual benefits of metaverse social interactions were merged into a single theme of benefits of metaverse social interactions. As a

result, the thematic map was further refined with a total of two main themes and twenty sub-themes.

5. Refining, Defining, and Naming Themes

The final themes were re-evaluated to ensure they captured the core concepts of the dataset. Since the analysis was based on an interpretive paradigm that assumes the complexities of multiple realities, it was essential to narrow down the focus within the scope of what the research questions needed to address. Each theme was defined with clear boundaries and labelled to outline its scope and significance. The themes were cross-checked against the research questions to ensure they provided a rich, nuanced understanding of the participants' experiences.

6. Writing Up

It is essential that the research is informed by the characteristics of the research method and the philosophical assumptions that regulate its paradigm. The interpretive paradigm of the qualitative aspect of this study is based on the assumption that multiple realities exist. The background and experiences of each individual included in the study are complex and idiosyncratic, therefore creating a diversity of worldviews the research is exposed to. The information shared by each participant was their unique way of making meaning of their lived experiences. Correspondingly, the subjectivity of the researcher's interpretations was also taken into account to ensure reflexivity of the entire process in the thematic analysis. The reciprocal influence in the focus group discussion and the subjectivity of this paradigm were kept in mind and considered an asset as reflexivity was engaged. The context of the participant's experiences was also taken into account throughout the process to develop a deeper understanding of their frame of reference in the final phase which involved writing up the findings in the Results section.

Results

Two major themes emerged: interpersonal connectivity and support; and the impact of metaverse social interactions. Table 1 summarizes the themes and sub-themes developed through the reflexive thematic analysis of the data obtained

through the focus group discussions. These themes are described below with their broad definitions and examples of the participants’ narratives. Only participant comments that were made in English are given here as examples. The nuances of the

Urdu comments would be lost in translation and thus were chosen not to be reported. Also, it should be noted that many of the extracts given are not complete sentences and several discourse markers were removed for ease of understanding.

Table 1
Themes Extracted from the Focused Group Discussion

Themes	Sub-Themes
Interpersonal Connectivity and Support	Sense of Social Presence Value of Trust Presence of Mutual Respect Value of Relatedness Affect in Interactions Sense of Belongingness Presence of Mutual Understanding Value of Self-Disclosure Presence of Emotional Support Presence of Informational Support Presence of Instrumental Support Sense of Security Personal Agency and Autonomy
Impact of Social Interactions	Physical Impact Cognitive Impact Spiritual Impact Interpersonal Impact Emotional Impact Psychological Impact Behavioural Impact

Interpersonal Connectivity and Support

Interpersonal connectivity and support represent a central theme exploring how individuals form and maintain relationships within the metaverse, highlighting the quality of social bonds and emotional connections. This theme captures various dimensions of social interactions, emphasizing the significance of presence, trust, mutual respect, understanding, and the support exchanged among users. It reflects how the metaverse fosters or challenges the development of meaningful relationships and support networks. The theme focuses on relational and emotional dynamics that contribute to a sense of community and well-being or, conversely, lead to negative social experiences. Key aspects include inter-relational factors such as trust, respect, and a sense of belonging within the metaverse community,

while excluding non-relational experiences or the technical elements of metaverse use. Thirteen closely interlinked sub-themes converge under this major theme, each contributing to the holistic understanding of interpersonal dynamics in the virtual space.

Sense of Social Presence

A sense of social presence refers to the feeling of being part of a social environment where one feels seen, heard, and acknowledged by others. The sub-theme of Sense of Social Presence encapsulates the feelings adolescents in Pakistan experience when they interact within the metaverse, perceiving themselves and others as being present and engaged in the same virtual space. This sensation of shared presence was reported as a crucial aspect of their metaverse interactions, as it significantly

influences the quality and depth of their social experiences.

During the focus group discussions, many adolescents described a heightened sense of immersion and engagement when interacting with peers in the metaverse. For instance, one participant remarked, "it feels like we are all sitting in the same room, even though we are miles apart". Several similar statements in the data illustrate the powerful perception of co-presence that transcends physical distances, making virtual interactions feel almost tangible. Another adolescent elaborated on the emotional impact of this sense of presence, stating, "It's amazing how I can feel someone's emotions through their avatar. Once my friend was sad, I could see it in her expressions, she sounded so down, and I kinda wanted to save her". This example highlights how the visual and auditory elements of the metaverse contribute to a realistic sense of presence, allowing users to pick up on emotional cues and respond empathetically.

Moreover, participants emphasized that this sense of social presence was not just about seeing and hearing their friends but also about feeling connected on a deeper level. "Sometimes, we just hang out and talk about our day, and I can feel they are right there with me, supporting me. It's different from texting or calling; it feels more personal and comforting". This illustrates how the sense of social presence in the metaverse can foster a more intimate and supportive environment, enhancing the overall quality of interactions. "social media and all is also good you know but that gets boring after a while, there's this missing bit of actually feeling like you are hanging around friends, like actually present right there, even if it's not human but it's like right there with you". Such statements were consistent across the data where the participants shared the importance of the immersiveness that fosters a sense of presence in the metaverse which is missing in the other digital worlds. This element of their social interactions was conveyed as one of the most critical components, without which their interactions would not feel important. In summary, the perception of being together and emotionally connected in a virtual space is facilitated by the immersive elements of the metaverse, making interactions feel real, emotionally resonant, and

supportive, thereby significantly enhancing their social experiences.

The sub-theme of Sense of Social Presence refers to the feeling of being part of a social environment where individuals feel seen, heard, and acknowledged. For adolescents in Pakistan engaging with the metaverse, this sense of presence is a key component of their virtual interactions, as it significantly enhances the quality and depth of their social experiences. This sub-theme encapsulates how users perceive themselves and others as being genuinely present and engaged in the same virtual space, despite physical distance.

Value of Trust

Trust emerged as a critical component in adolescents' social interactions within the metaverse, essential for forming and maintaining meaningful relationships. When adolescents perceive their peers as trustworthy, they describe they are more likely to engage in open communication and self-disclosure, strengthening social bonds and fostering a supportive community. Trust, in this context, refers to the confidence and reliance adolescents place on their virtual friends and communities, significantly impacting the depth and quality of their interactions.

Several participants emphasized that trust was foundational to their metaverse experiences. "I feel I can be myself more in the metaverse because I trust my friends there. They don't judge me like people in real life sometimes do." This sentiment highlights how trust enables greater authenticity and openness, allowing adolescents to share their true selves without fear of judgment. Another participant described, "Once, I shared something very personal with my metaverse friend, and they kept it private, that's when I knew I could trust them completely," illustrating how trust is reinforced through positive experiences, where confidentiality and respect are shown by virtual friends enhance the sense of security and closeness. Trust also plays a vital role in collaborative activities within the metaverse. One participant noted, "We often work on projects together in the metaverse like building castles and empires, and I trust my team to contribute their best. It makes our teamwork enjoyable." This demonstrates how trust

facilitates effective teamwork and cooperation, creating a supportive environment for shared endeavors. Additionally, adolescents highlighted that trust in the metaverse often develops faster than in real life due to the immersive nature of the platform, with one participant stating, "I feel like I trust my metaverse friends more quickly because we spend so much time together, and we can talk about anything." In summary, trust is fundamental in shaping adolescents' social dynamics in the metaverse, allowing them to be authentic, supporting confidential and meaningful exchanges, enhancing collaboration, and fostering quick, deep connections, collectively enriching their virtual social experiences.

Presence of Mutual Respect

The presence of mutual respect reflects how adolescents in Pakistan perceive and experience respect within their metaverse interactions, where opinions, values, and personal space are acknowledged, fostering a sense of being valued and understood. Throughout the focus group discussions, participants emphasized the importance of mutual respect. One participant shared, "In the metaverse, people seem to listen to you more. When I share my thoughts, my friends actually pay attention and don't interrupt, which makes me feel respected." This highlights how the digital space encourages more attentive and considerate conversations, where individuals feel heard. Another adolescent described handling disagreements, stating, "Even when we don't agree on something, we try to understand each other's point of view instead of just arguing. It's like we respect each other's opinions more in the metaverse." This suggests that the virtual environment can promote respectful and constructive dialogue, helping adolescents navigate conflicts maturely.

Respect for personal space and boundaries also emerged as a key aspect. "they know when to give me space. If I need time alone, they understand and don't push me to join the group." This demonstrates how mutual respect extends to recognizing and honouring each other's need for privacy, creating a supportive community. Additionally, mutual respect often translates into supportive behavior, as one adolescent mentioned,

"the respect I feel is super when I achieve something, my friends are genuinely happy for me and we celebrate my success together." This illustrates how mutual respect fosters a culture of support and positive reinforcement, enriching adolescents' social interactions by creating a respectful and nurturing environment.

Value of Relatedness

The value of relatedness captures the importance that adolescents in Pakistan place on feeling connected and relatable to others within the metaverse. This sense of relatedness extends beyond mere presence, encompassing shared interests, mutual understanding, and the ability to resonate with each other's experiences, thereby forming meaningful and lasting bonds. Focus group discussions revealed that participants often found like-minded individuals in the metaverse, enhancing their sense of relatedness. As one participant shared, "In the metaverse, I found a group of people who love the same games and shows as I do. It's like finding my tribe; we get each other and have so much fun together." This highlights how shared interests can forge strong connections, making adolescents feel understood within their virtual communities.

Another participant noted how the metaverse bridges cultural and geographical gaps, allowing connections with peers from diverse backgrounds: "I have friends in the metaverse from different parts of the globe, and even though we come from different cultures, we relate through our shared experiences of school stress and family expectations." This shows how relatedness in the metaverse transcends cultural differences, fostering unity and mutual understanding. Furthermore, the avatars and virtual identities in the metaverse play a crucial role in enhancing relatedness. One participant stated, "In creating my avatar, others relate to it, it feels like they understand the real me." Relatability was described as a component that if was not present, the social interactions would feel meaningless and superficial.

Affect in Interactions

Affect in interactions highlights the emotional pleasure and the range of feelings adolescents in

Pakistan experience during their social engagements within the metaverse. This sub-theme reveals that virtual interactions significantly influence emotional well-being, either enhancing or diminishing it. During focus group discussions, participants frequently expressed how metaverse interactions brought joy and excitement to their lives. One participant shared, "Whenever I log into the metaverse and see my friends, I instantly feel happier. It's like a burst of joy seeing their avatars and knowing we are going to have fun together." This reflects the immediate positive emotions these interactions can generate, providing a source of happiness and anticipation. However, not all experiences were positive. One participant recounted feeling negative emotions when playing a war game to conform and belong to a group: "I don't like war, but played to fit in, and I was not performing well and felt horrible and incompetent." This example highlights how being in the wrong community can elicit negative feelings.

Shared activities were also described as playing a part in enhancing enjoyment. "Even if I'm having a bad day, spending time with my friends when we are creating stuff together kind of makes everything seem better." This extract highlights how interactive activities can elevate moods and provide a meaningful escape. Additionally, the creative freedom in the metaverse contributes to personal satisfaction. "I love how we can customize our avatars and create our own spaces." Lastly, the emotional support from friends further enhances these experiences, as one participant remarked, "There's always someone to cheer you up or make you laugh," reflecting that the affective quality of these interactions enriches the overall social experience for adolescents in the metaverse.

Sense of Belongingness

The sub-theme of belongingness captures the adolescents' feelings of being part of a community and experiencing acceptance and inclusion within the metaverse. This sense of belonging plays a crucial role in their social interactions, offering emotional security and a sense of identity in virtual spaces. Several participants expressed how the metaverse provided a sense of belonging that was sometimes lacking in their real-world

environments. "In the metaverse, I can find people who share my interests and hobbies. I can feel that they are my people, and it makes me feel like I truly belong somewhere." This extract highlights how the metaverse connects like-minded individuals, fostering community and acceptance.

A female participant emphasized the inclusive nature of their virtual community, stating, "I love how everyone in our virtual group accepts each other for who we are. There's no judgment, and we all support each other, no matter what, even if I was to act like a boy." This example shows how the metaverse creates a non-judgmental environment where adolescents feel valued and supported, enhancing their sense of belonging regardless of gender roles. Group activities and events in the metaverse reinforced their sense of belonging, "we often organize virtual meetups and game nights, and everyone is excited to join," illustrating how shared experiences and regular interactions strengthen their feelings of inclusion. Additionally, the metaverse's ability to transcend geographical and social barriers was seen as key in fostering belongingness, allowing diverse individuals to come together and support each other, further enhancing their collective sense of belonging.

Presence of Mutual Understanding

Mutual understanding emphasizes the importance of recognizing and appreciating others' perspectives and feelings, enhancing communication, and reducing conflicts in the metaverse, a valuable component of metaverse social interactions as described consistently across the data. This sub-theme closely linked with trust, respect, and emotional support, is crucial for fostering meaningful interactions and relationships in virtual environments, significantly improving the quality of adolescents' social experiences in Pakistan. A vivid description is depicted in this extract, "When we're in our virtual study group, everyone gets where I'm coming from with my ideas and challenges. It's like they understand my struggles and offer support in a way that makes sense to me." Such shared understanding fosters a supportive and collaborative environment where adolescents describe feeling genuinely understood and valued. Another participant shared, "during our role-playing games, we often discuss our

characters' backgrounds and motivations, and it's amazing how we all are different but still manage to understand the other person's experiences," highlighting how mutual understanding deepens interactions, even when perspectives differ.

Mutual understanding also plays a crucial role in resolving conflicts. One adolescent noted, "whenever there's a disagreement, if we don't talk things through until everyone's viewpoint is clear, it becomes hard to move forward; I have been lucky as my people always reach a consensus quickly and move forward without hard feelings." This reflects the importance of effective communication and empathy in maintaining harmonious interactions.

Value of Self-Disclosure.

The value of self-disclosure reflects how adolescents in Pakistan perceive and utilize the opportunity to share personal information within the metaverse, playing a crucial role in building relationships and trust. This sub-theme captures both the positive and negative aspects of self-disclosure in virtual environments, "sharing my personal struggles with a friend, she's in Norway, in the metaverse was nice as she listened and offered support. I kind of felt understood and less alone," highlighting the positive impact of self-disclosure, where sharing personal challenges can lead to meaningful support and strengthened relationships, consistent with existing research on digital self-disclosure and support. Conversely, self-disclosure can produce negative experiences, such as a male participant with a female avatar described disclosing his true gender and subsequently feeling vulnerable and betrayed when the information spread, leading him to withdraw from the group. This incident underscores the risks associated with self-disclosure, where personal information can be misused. The thematic analysis in this study reveals that self-disclosure is considered valuable by adolescents when they are in a trustworthy community where they feel safe sharing personal information. It also illustrates how adolescents navigate the complexities of self-disclosure in virtual spaces, carefully weighing the emotional rewards against potential negative consequences.

Presence of Emotional, Informational and Instrumental Support

Support in the Metaverse explores how adolescents value emotional, informational, and instrumental support in virtual environments, highlighting both positive and negative experiences. Emotional support in the metaverse is highly valued, "my friends in the metaverse check in on me and cheer me up with kind words and virtual hugs, especially if it has been a bad day." However, some adolescents reported negative experiences, such as feeling dismissed or isolated when seeking support: "Sometimes, these people just don't respond and are so sucked into their own things, forget that I need emotional support, I am supposed to survive that!" Informational support is also crucial, "When building castles, my friends often give useful tips, which really helps me build faster before someone else takes over the land." This underscores the value of practical knowledge shared in virtual networks. Conversely, informational support can also be lacking: "sometimes, the advice I get from others is not always accurate or helpful, which can be frustrating."

Instrumental support, including practical assistance with tasks and challenges, was discussed positively by participants: "My friends often help me with tasks and challenges, especially in wars we help each other get weapons." However, some experienced inconsistencies, such as feeling left to handle technical issues alone: "Sometimes I feel like I'm left to figure things out on my own." Overall, the perceived support in the metaverse reveals a complex picture of emotional encouragement, valuable information, and practical help, with both strengths and limitations in the quality and consistency of support experienced by adolescents in Pakistan.

Sense of Security

Perceived safety and security in the metaverse explores how adolescents in Pakistan compare their virtual interactions with real-life experiences, focusing on feelings of safety and privacy. Metaverse interactions often offer a heightened sense of security due to anonymity and confidentiality, which allows individuals to interact without revealing personal details. "No one

actually knows who we are in real life, even if I swear at anyone, no one can catch me and next time I can simply change my digital identity and no one would know." Concerns about safety and privacy persist throughout the data. A participant warned, "I would never advise sharing personal information in the metaverse because who knows what new technology can come in and trace us," highlighting fears about data security, noting limitations in online safety features and privacy concerns, (Nicol et al., 2022). Negative experiences also reveal challenges in maintaining security, "There were these people who were not nice and tried to bully others; it made me feel unsafe and uncomfortable, even though I reported them to my friends." This example underscores issues with reporting mechanisms and the limitations of existing safety features in virtual environments. Overall, while anonymity in the metaverse provides a sense of security, concerns about privacy and safety risks remain significant. These findings reveal the need for improved safety measures to address the evolving challenges of virtual interactions.

Personal Agency and Autonomy

Personal agency and autonomy in the metaverse explore adolescents' experiences of control, identity formation, and self-expression within virtual environments. It encompasses how metaverse interactions enable teenagers to shape their personas, initiate or exit conversations, and navigate difficult situations, while also addressing real-world limitations such as physical disabilities. Across the data, the empowering aspects of metaverse autonomy are highlighted. "I love customizing my avatar and choosing how I want to present myself. It's like I have the freedom to be anyone I want to be, which makes me feel in control." This can also be an overwhelming challenge, "I feel overwhelmed by all the choices I have to make in the metaverse. It's hard to decide what to do or what my avatar should look like, and it can be stressful trying to fit in," reflecting the stress associated with decision-making in virtual environments, especially when curating a digital identity for the purpose of belonging to a certain metaverse community.

Autonomy in the metaverse can positively influence real-world interactions too. As one

participant observed, "being able to make decisions freely in the metaverse has helped me be more confident in real life too," suggesting acquiring skills that are transferrable in the real world too. A 15-year-old participant in the focus group shared his personal experience in the metaverse as liberating as he could play football, whereas in real life he was affected by polio in childhood and could not run or walk properly. This was corroborated by several others in all the focus groups that metaverse engagement can actually go beyond real-world limitations, such as physical deficits and social anxiety that seem to evaporate in the metaverse.

Impact of Social Interactions

The second theme incorporates the diverse impacts of the metaverse social interactions. This includes the beneficial or positive impacts on the physical health of the teenagers and also the adverse physical impacts such as low mobility, increased fatigue and weight gain. The impacts also incorporate cognitive effects such as improvement in problem-solving skills, time management skills, multicultural learning, enhanced mental chronometry, intellectual growth, effects on language and communication, open-mindedness, attention span, and changes in the ability to concentrate. Impact on values and spiritual health, religious identity is also an important component of this theme. The interpersonal, emotional, psychological, and behavioral aspects of the impact are also incorporated in this theme.

Physical impact addresses how metaverse activities affect adolescents' physical health, both positively and negatively. Some adolescents reported enhanced physical mobility and energy levels due to interactive metaverse experiences. One participant noted, "Using 3D devices actually makes you move in the metaverse; I can play golf and tennis at the comfort of my home. It's fun, though I've broken a few of mum's decoration pieces because I can't see what I'm hitting in the real world." This suggests that virtual activities can stimulate physical movement, offering an alternative to traditional exercises. Others found metaverse-based activities useful for managing existing health conditions, as one shared, "Using VR helps me exercise without putting too much strain on my legs, which is great since I have

mobility issues." Conversely, concerns about sedentary behavior were also highlighted. "Some people don't feel like moving and don't eat, but I know people who are constantly munching and have no exercise and gained weight," reflecting concerns about weight gain and fitness decline. Additionally, physical discomfort from prolonged use was also described, with one participant saying, "I sometimes get headaches and feel exhausted after long sessions in the metaverse," echoing Wiederhold et al. (2014) on physical strain as an adverse effect of digital devices.

The metaverse social interactions have a cognitive impact that includes enhanced problem-solving skills and time management. An extract here describes this, "Problems come up a lot and you have to learn how to solve them, even how to speed up with time." This reflects improved critical thinking and decision-making abilities. Anderson and Rainie (2018) support this, suggesting that digital environments foster problem-solving skills. Adolescents also discussed improved time management, with one noting, "I feel like the metaverse has taught me to prioritize and plan my time better, especially when I have to juggle schoolwork and social interactions online." The metaverse's diverse learning opportunities are also highlighted as a cognitive impact as, "Interactions feel valuable if there is something new to learn," showing the value in experiential learning. However, concerns about diminished attention spans due to overstimulation were also expressed. "I sometimes find it hard to concentrate on my schoolwork after spending a lot of time in the metaverse," reflecting the challenging cognitive multitasking impacts. The sub-theme also encompasses changes in language abilities, communication, concentration levels, and mental chronometry, reflecting both positive and negative cognitive impacts of metaverse interactions.

Results also included a spiritual impact which encapsulates how metaverse interactions affect adolescents' spiritual health and religious identity. Participants observed that while the metaverse could introduce feelings of peace, it can potentially lead to spiritual discontent as well. "We kinda get used to people doing stuff that we don't ourselves do, things that our parents might say is haram (sinful), we can't stop anyone," is an exemplary

extract of how diverse content might conflict with personal values, such that may contradict religious values. There are also noticeable shifts in the values these teenagers hold. For instance, those who previously valued peace has begun to act out aggressively in war games. Additionally, some are experimenting with gender transformations in the metaverse, even though they have never experienced any gender confusion in real life. They explained such shifts are causing a state of religious conflict internally, and induces fear of parents finding out. Conversely, staying firm on their religious values emerged as a buffer against such negative impacts, with several significant examples as such, "our religion teaches us to keep a balance and I know others get affected easily but when it's time for namaz (prayer), I switch off and offer my prayers."

The metaverse social interactions also impact interpersonal relationships affecting communication patterns, trust, and emotional intimacy. Positive aspects included enhanced connections and shared experiences. "I have started feeling more connected to my friends, even if we are far apart," reflecting how virtual presence is affecting relationships even when geographical distances exist. However, challenges arise when managing boundaries in the metaverse, which can feel overwhelming for teenagers. Since the metaverse is essentially boundless, they often experience a lack of clear time and space boundaries, leading to confusion and a sense of being overwhelmed by its never-ending nature. This can lower their social barriers, and the exhaustion from prolonged interactions can negatively impact their interpersonal relationships. "I feel like my boundaries are blurred, I need to remind myself that I am not in the real world and that I need to stop because if I don't I know I can get intrusive with some people there which isn't my nature you know," one of the few examples that reflects concerns about how boundary issues interplay with their relationships. Additionally, changes in communication patterns occur, "there's a lot of emos and short messages," with developing new vocabulary as well. Teenagers experience a mixed sense of trust in the metaverse; some feel a strong connection with their metaverse friends, while others doubt the authenticity of these

relationships, which in turn makes them question their real-life friendships as well. The fast pace of the metaverse impacts patience and irritability, both in the metaverse and in the real world; "I hardly have any patience now for when my friends are talking, in fact, I get so irritated at times that I just complete their sentences because they are so slow, even cars feel like they are moving too slow." This finding is also connected to mental chronometry, a cognitive effect, that in turn influences how teenagers interact with others.

The emotional impact of metaverse interactions encompasses how they affect emotional regulation, support systems, and overall well-being. Teenagers often turn to the metaverse for emotional relief or catharsis. This relief is not always verbal; it can also occur through gaming, where they can channel their pent-up feelings and release them in a virtual space without fear of negative repercussions. Such emotional support is consistently described across the data with short term emotional burst helping teenagers cope with challenging feelings. However, there is a variation noted when it comes to long-term benefits; "there's always some emotional support there too, but you eventually need some real advice, you've gotta rely on people who really care about you for that," reflecting on the limitations of the emotional support available; "some things can't make me feel better just because I have people to talk to in the metaverse". The constancy of support is also varied, where several teenagers express having someone there all the time that feels good, whilst others find such support intermittently. The metaverse is also helping teenagers to regulate their emotions to some extent as they describe the process of feeling heard and releasing heavy emotions safely within their metaverse social community. This in turn is helping reduce emotional outbursts in the physical world and also managing challenging feelings such as anxiety. There are also concerns about emotional exhaustion among teenagers when they are constantly providing emotional support to others or when the support they receive serves only as a temporary distraction from their real-life problems, leading them to procrastinate seeking real help.

Another impact is psychological which affects teenagers' self-esteem, life satisfaction,

hopefulness, psychological distress, and quality of life. Several teenagers experience enhanced self-esteem and life satisfaction as a result of social engagements where they feel valued. "There is always a feeling that there is someone always present in the metaverse and ready to hear me out, that is importance I don't feel in my own family. The excitement and possibilities of the metaverse give teenagers hope by allowing them to achieve things that might not be possible in the real world. They describe feeling productive and useful, and they also feel more tech-savvy than older generations, which boosts their confidence and self-esteem. However, some experience increased psychological distress, when real-life problems exist and get worse because of procrastinating and distracting themselves in the metaverse. They end up feeling a lack of confidence for not being able to solve their problems and feel low self-worth. In the context of the metaverse, adolescents also experience an increase in their self-efficacy. Achieving goals or mastering new skills within the virtual environment contributes to their overall psychological well-being and can enhance their self-confidence in both virtual and real-life contexts; "we have been able to build an entire empire in the metaverse, and make us feel so powerful and confident that I feel the same way when I meet my local friends here outdoors."

The behavioral impact of metaverse interactions encompasses changes in behaviors and habits, such as risk-taking, self-care, and social dynamics. There is an increase in risk-taking behaviors within the metaverse, "I feel bolder and more willing to take risks because the consequences don't feel as real." This environment encourages experimentation, sometimes leading to more daring behavior than in the physical world. Such behaviour is reported to build confidence and self-efficacy consequently. New habits and social behaviors also develop over time with more exposure to metaverse social interactions, such as adjusting daily routines to accommodate virtual friendships. "I started waking up earlier to connect with friends in the U.S., since they're in a different time zone," highlights how virtual relationships can influence real-world behavior. Overall, the behavioral impact of metaverse interactions reveals a complex mix of positive and negative

effects. While the metaverse can foster beneficial changes like improved self-care and coping mechanisms, it can also lead to compulsive behaviors and imbalances that underline the need for mindful and balanced digital habits.

Discussion

The focus group discussions with Pakistani adolescents reveal a complex interplay of social and psychological experiences in the metaverse, where various themes and sub-themes converge to shape their interactions and development. These themes offer a comprehensive view of how the metaverse influences adolescents' lives, demonstrating that these aspects are not isolated but interconnected, reinforcing one another. Understanding these dynamics is crucial, particularly as adolescents navigate formative years marked by identity exploration, social relationships, and mental health challenges.

The perceived sense of social presence and belongingness has consistently been expressed to enhance a sense of connectedness and security, which in turn bolsters a sense of belonging in the metaverse community. This feeling of belonging is crucial for fostering mutual respect and understanding, creating a supportive environment where adolescents feel they can thrive. This sense of belonging is foundational in Self-Determination Theory (SDT), which emphasizes the importance of social relatedness in achieving psychological well-being and intrinsic motivation (Ryan & Deci, 2001). In the metaverse, the perceived social presence acts as a foundation for trust and mutual respect, essential components for meaningful and supportive interactions. Moreover, the finding that suggests the importance of feeling understood in their interactions, is consistent with the findings of Vasalou et al. (2008), who emphasize that mutual understanding and empathy significantly enhance the quality of online social interactions, fostering strong communities and positive relationships. In the focus group discussions, the adolescents reported that trust and respect facilitate open communication and self-disclosure, further strengthening their social bonds. This sense of security and control, essential for adolescents, is amplified in the metaverse, where digital avatars offer anonymity and the freedom to experiment

with identity, beyond the limitations of the real world. The ability to control their virtual persona, including gender and appearance, provides a sense of competence and autonomy, reinforcing the principles of SDT. Conversely, a perceived lack of social presence and belongingness in the metaverse can lead to feelings of isolation and insecurity, which may weaken adolescents' connection to the virtual community. This detachment can undermine trust and mutual respect, resulting in less meaningful interactions and a diminished sense of autonomy and competence, counter to the principles of Self-Determination Theory.

Focusing on the perceived positives and drawbacks of metaverse interactions is particularly essential for adolescents, as this age group is undergoing significant developmental changes that shape their identity, social skills, and emotional well-being. Adolescents are at a critical stage where they are exploring their identities, and the metaverse provides a unique platform for this exploration. Understanding the nuances of their experiences can inform educators and mental health professionals about how to better support adolescents in navigating these digital environments. This research can contribute to theoretical perspectives by bridging existing literature on adolescent development, social psychology, and digital communication, providing a comprehensive view of how virtual interactions influence real-life outcomes.

Furthermore, it has been suggested by Haythornthwaite (2007) that online communities can offer significant emotional backing, such that in this study, highlighted that the metaverse provides genuine emotional support. The study reveals that teenagers find several kinds of support through their metaverse social interactions, consistent with previous studies that highlight the importance of support that online communities offer (Valkenburg and Peter, 2009). There is however, variability in the support quality which is also reflected in findings by White and Dorman (2001), who noted that online support can vary greatly in responsiveness and sensitivity, however, the presence of it is always welcomed and craved for.

Anonymity and confidentiality in the metaverse emerged as another prominent theme that

adolescents valued as it fosters the ability to disclose personal information and offload emotional burdens without revealing their real-life identities. This anonymity provides a safe space for self-disclosure, leading to relief and support, and contributing to an overall sense of belonging and well-being as observed by Desjarlais (2022). The absence of strings attached to these interactions allowed them to express themselves freely, without the fear of judgment or repercussion, fostering a unique form of emotional intimacy and psychological safety. Being able to fully express and self-disclose in the metaverse aligns with the work of Kuss and Griffiths (2017), who emphasized how digital self-expression enhances feelings of empowerment and individuality, thus indicating the importance of feeling in charge of shaping one's digital identity.

There is, however, a challenge with the anonymity in the metaverse that it can lead to a lack of accountability, where adolescents might engage in harmful behaviors without facing real-world consequences. The anonymity can enhance a perceived sense of security, however, it also poses a challenge of deception of identity and digital privacy as indicated in several other pieces of research, (Dhillon et al., 2019). This is consistent with the literature including the works of Nicol et al., (2022) who highlight the fears about data security, noting limitations in online safety features and privacy concerns. The varied experiences that came up in the focus group discussions reflect that anonymity and confidentiality may potentially be also a threat to the well-being of adolescents without the assurance that their interactions are happening in a safe and secure environment.

The dual nature of self-disclosure is well-documented in the literature, where the benefits of forming intimate connections are balanced against the risks of privacy breaches and social vulnerability (Vasalou et al., 2008; Valkenburg & Peter, 2009). This underscores the risks associated with self-disclosure, where personal information can be misused, echoing concerns in studies on privacy and digital communication (Hampton et al., 2011). Moreover, the challenge that comes with this is also that a detachment from real-life identities can create superficial connections, potentially eroding the depth and authenticity of

relationships, and fostering a false sense of emotional security, a concept of online disinhibition effect that is also observed by Suler (2004).

The multifaceted impacts of metaverse interactions on adolescents' physical, cognitive, and behavioural well-being are varied. Physically, while the metaverse might encourage increased activity through immersive experiences, it also poses risks of sedentary behavior, potentially leading to health issues. The very nature of the social interactions, such that involve physical activities or require sitting for hours, determine the kind of impact on physical health echoing Wiederhold et al. (2014) on physical strain as an adverse effect of the digital devices. Moreover, with the deep state of flow in their social engagement, teenagers may or may not indulge in excessive eating patterns or forget to eat at all. This is a debatable issue and requires in-depth research on its own.

The autonomy and agency experienced in the metaverse have been observed previously in research suggesting the significance of confidence and autonomy as skills that can be transferred from virtual to real contexts (Vasalou et al., 2008). The findings revealed that the metaverse can assist in overcoming real-life limitations such as physical impairments. Evidence to support this exists in the work of Levac and Galvin (2013) on VR-based rehabilitation. With multisensory stimulations in the metaverse, and exposure to multicultural communities, the metaverse social interactions have the potential to stimulate intellectual growth and learning consistent with Gee's (2007) view on experiential learning, however, it also risks cognitive overload if not balanced properly. The positive cognitive effects are supported by Anderson and Rainie (2018) suggesting that digital environments foster problem-solving skills such as improved critical thinking and decision-making abilities. Additionally, mental chronometry is described by adolescents as a state that has increased their ability to process several functions with higher speed but at the same time, it also affects their real-life interactions where they experience irritability and impatience, a phenomenon that aligns with Rosen et al.'s (2013) research on digital impatience. This not only

impacts their behaviour overall but also their close relationships affecting the depth and authenticity of real-world relationships. The behavioural impact is particularly significant, as adolescents reported adopting new habits and, in some cases, developing compulsive behaviors. For instance, the constant checking in with friends or the urge to maintain a virtual presence can disrupt daily routines and concentration in real-life settings. This compulsive behaviour is indicative of the broader behavioural effects of deep engagement in digital worlds, highlighting the need for balanced digital habits. Creating a balance in the metaverse social interactions is indicated in the spiritual and psychological impacts as well, reflecting the influence of metaverse interactions on adolescents' sense of purpose, identity, and mental health. Positive spiritual experiences in the metaverse might include a heightened sense of peace and existential meaning, while negative experiences could lead to psychological distress and identity confusion. Similarly, the duality of the emotional impact of metaverse interactions is significant where on one hand providing emotional catharsis and validation, offering relief from real-life stressors, and on the other hand, they can introduce new challenges in managing emotions, as the digital environment can sometimes amplify feelings of anxiety or alienation. The diversity of emotional impacts indicates that the nature of interactions and the communities in which teenagers engage are crucial in shaping their emotional experiences. Additionally, personal life factors, such as exams or recurring health issues, significantly influence their emotional state. While temporary emotional distractions in the metaverse may provide relief, they often lead to procrastination, ultimately exacerbating their real-life challenges.

The changes in social functioning, trust, and emotional intimacy, also play a critical role in shaping adolescents' experiences in the metaverse. These interactions influence how they perceive and navigate relationships, both online and offline, affecting their social development. The support provided in these digital interactions, as explained by social support theory, can significantly influence adolescents' well-being and develop healthy coping strategies. Diverse emotional,

informational, and instrumental support within the metaverse has the potential to provide comfort, guidance, and practical help, all of which are crucial for coping with challenges and everyday stressors. Conversely, disruptions in social functioning, trust, and emotional intimacy within the metaverse can hinder adolescents' ability to form meaningful connections, potentially leading to isolation or distorted perceptions of relationships. Rather than fostering healthy coping mechanisms, insufficient or negative digital support may exacerbate stress and contribute to maladaptive behaviors.

The findings from the focus group discussions can be further understood through the lenses of Erikson's Stages of Psychosocial Development and Bronfenbrenner's Ecological Systems Theory. Erikson posits that adolescents are primarily navigating the stage of "Identity vs. Role Confusion," where they explore different identities and grapple with questions of self-concept and belonging (Erikson, 1968). The metaverse provides a unique platform for this exploration, allowing adolescents to experiment with various aspects of their identity, thereby facilitating a more profound understanding of themselves and their social roles. This experimentation can lead to both positive outcomes, such as enhanced self-awareness and confidence, and negative consequences, such as confusion and disconnection from their authentic selves. Similarly, Bronfenbrenner's Ecological Systems Theory emphasizes the importance of contextual influences on development, highlighting how adolescents are shaped by interactions within their immediate environments and broader social contexts (Bronfenbrenner, 1979). The metaverse represents a microcosm of these interactions, where peer relationships, cultural norms, and digital engagement intersect to influence adolescents' development. The interplay between their digital experiences and the surrounding ecological systems can profoundly impact their social skills, identity formation, and emotional well-being, underscoring the necessity of understanding these interactions within both micro and macro contexts to support healthy adolescent development in an increasingly digital world.

In conclusion, the interplay of perceived positives and drawbacks of metaverse interactions among adolescents reveals a nuanced landscape that significantly impacts their social and psychological well-being. Addressing the complexities surrounding social presence, anonymity, self-disclosure, cognitive and physical implications, and emotional experiences provides a comprehensive understanding of how these elements contribute to identity formation and social development. Focusing on these experiences among adolescents is critical for understanding the implications of virtual interactions on their growth and development, paving the way for future research and practical interventions aimed at optimizing the benefits while mitigating the risks associated with adolescent engagement in the metaverse. This research is essential not only for theoretical advancement in the fields of psychology and digital communication but also for practical applications in education, mental health support, and the design of safe and enriching digital environments for young users.

Limitations

A limitation of this study, typical of qualitative research, is that the findings cannot be generalized across all age groups or samples who have little or no exposure to the metaverse. Secondly, due to the interactive nature of the focus group method, it is possible that the results could have been impacted by it which is inevitable in qualitative research (Tuckett et al., 2004). Moreover, since adolescents take pride and ownership in their digital interactions, like their metaverse social interactions, they tend to be positively biased in their perceptions of their metaverse and other online experiences. Therefore, it must be kept in mind that the current study explores the subjective experiences of adolescents and bias is inherent in any subjective data collection. Moreover, in assessing the mental well-being of adolescents, it is more useful to have a multi-informant perspective to get a clearer and unbiased picture. Teachers and parents are found to have been able to provide valuable predictive information on the overall well-being of adolescents. Hence assessing their perceptions and opinions on the wellbeing of the adolescent can provide a more comprehensive

understanding of the impact of metaverse social interactions on their well-being. Thus, it would also provide a better understanding to devise interventions for adolescents.

Conclusion

The themes that emerged in the study reveal that the metaverse is not merely a virtual playground but a space where adolescents cultivate a sense of belonging, engage in meaningful interactions, and explore their identities. The interdependence of these themes suggests that adolescents find the metaverse valuable for fostering social connections, autonomy, and personal growth. Understanding these interrelationships is essential for comprehensively addressing the impacts of metaverse interactions on adolescents' development. The principles of Self-Determination Theory and Social Support Theory offer valuable insights into how these interactions influence personal growth, social support, and overall well-being, underscoring the importance of fostering supportive, respectful, and enriching digital environments for adolescents. The study enriches the limited literature on metaverse experiences, offering insights for researchers, mental health professionals, and policymakers. As adolescents increasingly engage in the metaverse, there is significant potential to leverage this space for promoting positive well-being and developing targeted interventions.

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