

Identity Crisis: The Construction and Role of Virtual Selfhood in Suicides

Dr. Farah Ashraf

ICSSR Post-Doctorate Department of Sociology Srinagar, UT of J&K

Email: farashraf12345@gmail.com

KEYWORDS

ABSTRACT

Electronic media, identity, mental health, pathology, suicide The Internet and World Wide Web have woven together humanity in new ways, creating global communities, new forms of identity and pathology, and new modes of intervention. The Internet sites are transforming the ways emerging adults engage with others in their social worlds. This qualitative study examines communication processes of identity construction within social interactions among emerging adults using multiple social networking sites.

The most common use of the Internet among youth is to communicate with peers (Subrahmanyam et al., 2001). Social networking sites are transforming the ways they do so as they become more widely used and replace face-to-face interactions with online exchanges (Boyd & Ellison, 2007). Because adolescents and emerging adults construct their identities through peer interactions (Erikson, 1959; Arnett, 2000), suicide is the second leading cause of death in youth aged 10-24 years old globally (Patton et al., 2009), examining the nature of their online communication is critical to understanding the potential implications of these technologies for the process of identity development. The goal of this study is to scrutinize how emerging adults present themselves to each other on social networking sites, as they construct a shared and relatively public social space in which images of the self are broadcast. This study also surveys (a) how the Internet is transforming human functioning, personhood, and identity through the engagement with electronic media; (b) how electronic networking gives rise to the emergence of new pathologies of the Internet, for example Internet addiction, group suicide, and cyber bullying, and imbalanced mental health concerns.

.



INTRODUCTION

We all now live in an information age; we are all part of an informational society. Inventions have their greatest impact when they go beyond their possible practical applications and act upon the imagination. The Internet and associated technologies have been heralded both as a source of great boons and new human potentialities and as the cause of serious social problems and pathologies. There has been seen a significant increase in the use of social media platforms coinciding with the global adoption of such media as a form of entertainment and social interaction. Information and communication have been central to all previous societies and they have been critical to their economic, social and political development. The late twentieth century has seen a Communications Revolution. Social media platforms have increasingly been integrated into many aspects of peoples' daily activities, as a result of the limitless applications on mobile devices (Mihailidis, 2014). The personal computer, the mobile phone and access to the Internet are transforming information societies – societies where information is important and widely used – to informational societies – societies where information technology is a way of life, an essential feature of the home as much as the workplace, societies that are part of a global network of communication and economic activity. And, at the heart of the Information Revolution is the internet, the queen of all networks and the subject of none (Slattery, 2003). As of 2022, 69% of the world's population, or 4.9 billion people, actively use the internet. Trends indicate that the number of internet users grows at an annual rate of 4%, meaning that roughly 196 million new people access the internet each year. Smartphones have changed the way people access the internet and made the online world more accessible to the general population. Between the years 2021 to 2022 only, 268 million smartphone users were added globally. The growth of smartphone users has helped the mobile share of internet usage grow from 43.7% to 55% in just 5 years. It is projected that by 2025, 72.6% of worldwide smartphone users will access the internet solely from their phones. If worldwide and individual networking is one of the key features of the internet, the other is its speed – its speed of response and its speed of development and expansion. Anyone with access to a personal computer and modem or mobile phone and internet access can link up to anywhere in the world with anyone of whatever their age is (Global Digital Report, 2022). Many scholars envisage a progressive, inevitable convergence of the offline and the online realities or, as others put it, of the physical and the virtual realms. Many have viewed the Internet as intrinsically democratizing, allowing the freeexchange of information and providing people with a more comprehensive view of their local situation and a kind of public voice or representation (Hand & Sandywell, 2002). The debate on this issue often fails to recognize that, from a philosophical point of view, the difference between the real and the virtual dimension of reality precedes and does not entirely depend on the distinction between practically real life and online domain. This means that the differentiation between reality and virtuality is already insular to the offline reality. This differentiation is important for the construction of personal identity. As World Wide Web is open to individuals and to small groups or communities to use as it is to the major networks and to the multinational corporations. It can break down barriers; facilitate worldwide communication on a level previously undreamed of. It can be used to challenge those in power, through alternative



information or group collaboration, just as much as it can be to create new communities, clubs or societies. Personal identity is now a much more open matter. It is no longer restricted by traditional roles or identities. Men and women, children, youth and the senior citizens are now able to create their own identities and less likely to have them imposed upon them. It is a massive enterprise and one that clearly focuses on the essential features and developments today, the new technologies, the internet, the global economy and the apparent loss of personal, cultural and national identity that the new networked world seems to bring (Slattery, 2003). Identity is defined as selfhood, a continuous sense of sameness within oneself consisting of socially constructed self-concepts (Harter, 1999). We can speak of construction because our personal identity necessarily exists across time and is constituted, at the same time, of what we are (i.e., the "actual self" made of information describing our features) and of what we would like to be or what we ought to be (i.e., the "ideal self" made of information describing our expectations or the social expectations about us). In other words, personal identity is always constituted of both reality and imagination (virtuality). These self-concepts include such things as one's perceived traits and roles, but also one's desired selves and one's social identity, that is, associations with others and affiliations with social groups (Erikson, 1959; Marcia, 1966; 1980; Waterman & Archer, 1990).

UNESCO (2016) defines youth as the population group ranging from 15 to 35 years of age. Youth, according to that definition, are the most at risk age group of committing suicide in populations across societies and cultures (World Health Organization, 2017). Transitioning through this stage of life requires young people to cope with changes in hormones, physical state, mood, and social behavior in their exploration of identity and quest for autonomy. Suicide is the second leading cause of death in young people aged 10–24 years old, globally (Patton et al., 2009). As technology has progressed, the boundaries between internet, social networking sites, social media, online gaming and digital technology have become increasingly blurred. The links between stressful events and experiences, mental breakdown, deliberate self-harm, suicidal ideation and later suicide attempts are well established (Victor & Klonsky, 2014; Mars et al., 2019). Some groups of young people face higher risks of suicide as they have to deal with all of those transitional challenges as well as dealing with other challenges such as a broken family, intimate relationship break-up, substance abuse, poverty, family conflicts/discords, sexual abuse, and vulnerability. Over the past decade, suicide has gained prominence across all social groups as the world experienced a significant change in lifestyle with the rise in technological advancement. Social media and youth suicide combination is because of the high and increasing worldwide usages of social media. Adolescent suicide is also a worldwide challenge that many countries and cultures are currently facing. Unfortunately, social media usage has popularized the act of suicide both directly and indirectly, from its means of information sharing to the influence and consequences it has on emotional health. It also has indeed resulted in an upsurge of suicide risk factors and suicide-related behaviors. The fact is that man is a social being who does not exist in isolation spells out the importance of communication to human survival.



Concept of Self: Self-concept is an essential part in the development of personality. Self in terms of psychology has two meanings that are attitude and feelings of a person towards himself, and something the whole psychological process that controls behavior and self-adjustment (Suryabrata, 1982). It is a person's perception of himself, which was formed through the perception and interpretation of one's experience of him (Shavelson & Bolus, 1982). Selfconcept is the composition of self-perception's picture, that perception is belief, feelings, and attitudes about the values that are recognized by the individual as his traits. The composition of self-concept is formed from a variety of experiences in stages, the meaning that the composition is formed from experience since the childhood as a basic element. From that basic elements of the arrangement, formed the subsequent experience. Every element of self-concept of the new, composed with arrangement to self-concept has been established before, and the arrangement affects the shape of the arrangement that next ensues. The term self-concept is used as a makeup primer base; it is composed from all social experiences gained from family life that have influenced it. As such, form of involvement in the family affects the quality and intensity of selfconcept person, next (Hurlock, 1979). The Self-concept is self-esteem, self-worth or selfacceptance that includes all beliefs and judgments about ourselves; it will define who we are in our own mind, what we can do in our minds and what we become in our minds (Burns, 1993). Mead (1934) developed the theory of the self. He claimed that self is evolved from the basic relationship of the individual with other individuals in the social process. Through social interaction, self grows as the social structure of a social experience. The self-concept grows and develops as an object. As an object, the concept of self has a characteristic form of social identity, a self-image that has been adapted to the demands of their social environment. Selfconcept thus allows one to anticipate the reactions of others and allow the person to put themselves in the midst of its environment. On the basis of understanding that individuals can form in anticipation of the reaction of others towards him, so he was able to establish appropriate behavior. Individuals learn to give meaning to the environment as well as every person in his environment also do the same? The growing social self is a social experience. Language is the connecting element between the self and the community. Self and society are two inseparable things, resulting in steady and sustainable development of the underlying behavior of the individual. The basic symbolic interaction principle states that society shapes self which then shapes behavior (Sulimani-Aidan et al., 2019). The ideal self-concept can be composed of dreams and fantasies, as a form of disappointment and escape someone. Hence, the ideal selfconcept is negative, can be a barrier in adjustment (Jerslid, 1963). In the formation of selfconcept, the ideas owned or coveted by someone, sometimes different from the reality, including very high aspirations and expectations that are difficult to be realized. If there is a match between what is desired and reality, it will create self-acceptance.

Identity and Identity Crisis: In the philosophical perspective that goes from Heidegger (1927) to Foucault (1980 & 1994), power is also a means of self-knowledge: human relations are relations of power aimed to devise who we are. From this standpoint, we do not only make use of knowledge as a form of power. We also make use of power as a form of knowledge: what I am



depends on what I am capable of doing both as regards to myself and to others. In this sense, it is not the identity that brings about capacities. Rather, capacities determine the identity. It is must to state that from the very beginning how online domain networks enable people to construct their personal identity in a way that is different from what happens in the physical reality. In the physical reality, we construct our identity within different environmental and social constraints, i.e., within different contexts, that are mainly already structured and given. In contrast, in the digital reality, social networks for instance are platforms (as in the case of Facebook) that enable users to take advantages of networked affordances in order to construct not only their identities but also to participate in the co-constructions of their networked contexts of communication. On the contrary, it does produce consequences in real life. This makes it necessary to translate the virtual dimension of online existence into the empirical terms of offline existence (Durante, 2011). In this sense, accountability is not only a key part of our personal autonomy but, when referred to the online world; it can also serve as a principle of reality. Nowadays, smartphones have also become an essential and basic necessity of our lives. Nevertheless, they also have several negative effects on adolescents in their growing ages. There are studies (Wang et al., 2017; Canale et al., 2019) reporting that adolescents' smartphone overuse is associated with their self-esteem, life stress, anxiety, depression, impulsivity, friends and social communication conflict, and family communication conflict. Overuse of internet is also a manifestation of internet addiction in a broad sense, depending not only on the social use of the web but also on online gaming and shopping (Young, 2004; Widyanto & Griffiths, 2006). Research has also reported that the physical processes that make adolescents more prone to poor decision-making and cause difficulty in emotional regulation and self-control are because of structural complexity and the imbalance of structural and functional changes between the subcortical areas generated by emotion- and pleasure-related experiences (Finkenauer et al., 2005; Reyna & Farley, 2006). A national surveillance study on Internet addiction shows that Internet addiction is more harmful and dangerous than other forms such as alcoholism, smoking, and sexual addiction that are widespread among the population (Cheng et al., 2018). Changes in the groups and networks in which people and their identities are rooted and are in the societal structures, subject positioning, dominant societal ideologies and practices in which those networks are embedded are becoming more common and complex (Pegg et al., 2018). There seems to be a constant struggle and disconnect between who someone is, the identity their appearance performs, what they want to express and how they want to be identified. The challenge of reconciling the avowed and ascribed identity is by far a challenge that many youth have to deal with (Lawless, 2015).

LITERATURE REVIEW

For **Manuel Castells** (1996-1998), the defining characteristics of post-modern society are information technology, the internet and the informational society that is being created all round us. In the Information Age, Castells has set out to identify, describe and analyze what he considers to be the key features of post-modern society and economy. He seeks to do so in three volumes, Volume I (1996) focuses in on the internet and the economic implications of the



'networked society'. Volume II (1997) focuses in on the implications for the self, for personal and communal identity in a networked age when the traditional sources of identity, the family and the nation-state no longer seem relevant. Volume III (1998) seeks to draw all these strands and trends together, combining theory and observation into overall conclusions about the nature and shape of society in the future. His fears about the collapse of traditional social structures and loss of identity in a social world that man can no longer shape as he wishes, are equally profound and pessimistic.

According to **Vincent** and **Basil** (1997), the use of the media and current events are recognized and understood by college students, namely (a) habit, (b) surveillance, (c) escapism, (d) passing the time and (e) entertainment. They have also developed a scientific measure to determine the use and enjoyment of the internet in a new information environment.

Marcella (2001) observes, the demographic distribution on the internet had changed dramatically in recent years, especially its gender composition. Marcella noted that women had increasingly used the social networking sites, which enabled them to experience good things in life and combat anxiety, nervousness and helplessness.

Sampasa and Lewis (2015), have found that young people with mental health problems are heavier users of social media.

John et al. (2018), reviews the meta-analysis found that victims of cyber bullying are at greater risk of self-harm and suicidal behaviour. Cyber bullying perpetrators were at increased risk of suicidal ideation and suicidal behaviours.

Stiglic and Viner (2019), investigated associations between a range of health and wellbeing outcomes and screen time in young people. There was some evidence of associations between screen time and depression, but weak or insufficient evidence of associations between time and factors, such as suicidal ideation. They have also found an association between increased screen time and worse mental health in young people.

Danie et al. (2022), suggests that the relationship between internet use and self-harm and suicidal behaviour is mixed, with the potential for harm, but also scope to foster a sense of community, offering isolated young people supportive contacts. Guidance is required, but there remains a paucity of evidence to inform this. There are suggestions for strategies, such as: a 'Family Media Use Plan', 'Digital Literacy' being taught in schools, increased support for parents and the need for funding of new research, to ensure future guidance is evidence-based.

OBJECTIVES OF THE STUDY

To examine communication processes of identity construction within social interactions
among emerging adults using multiple social networking sites and also to explore how
emerging adults present themselves to each other on social networking sites, as they
construct a shared and relatively public social space in which images of the self are



broadcast.

- To analyze how the Internet is transforming human functioning, personhood, and identity through the engagement with social media;
- To examine how social media and networking sites give rise to the emergence of new pathologies of the Internet, for example Internet addiction, group suicide, and cyber bullying, and imbalanced mental health concerns.

APPROACH & METHOD

For the purpose of the study and inspired by the idea as is well-explained by Erving Goffman's (1959) perspective that people usually tend to behave as if they were acting in the theatre, presenting or pretending to have a different identity virtually which possibly explains the identity crisis of self-presentation. Therefore, the theory of dramaturgy by Erving Goffman (1959) was adopted. According to Goffman (1959), people usually behave as if they are acting in a theatre. Their performances change in accordance with the roles they are involved in so that they adopt different personas in different social settings. In other words, the way people represent themselves to their family differs from the way they represent themselves to their friends and colleagues. These representations may even differ from who they actually are. Goffman identified these interchangeable personas as a dramaturgy. Goffman in The Presentation of Self in Everyday Life (1959) drew an analogy between interchangeable personalities and theatre performance from the perspective of dramaturgical principles. Just as a theatre has a front stage and a back stage, people also have their public identity and their private identity. However, the asymmetrical personas that someone may choose may affect or overlap with the original persona.

This study is both qualitative and quantitative in nature based on primary as well as secondary sources of data collection. The primary mode of data collection was collected through a structured questionnaire that included different variables of demographic characteristics, namely, gender, age, education level, family occupation and family income for the purpose of this study. Also, data on anxiety and depression symptoms (i.e., feelings of sadness, hopelessness and restlessness, disrupted sleep, loneliness, mood disorders, lack of interest, excessive fears and worries, low self-esteem, feelings of worthlessness, increased heart rates and panic attacks, palpitation, social phobia, anger even over small matters, sensitivity to criticism, rejection or failure, frequent thoughts of death, dying or suicide) and suicide-related information included in the questionnaire complied information on the reasons behind the suicide attempts (i.e., family conflicts/discords, broken family, poverty, substance abuse, sexual abuse, life stress, anxiety, depression) and the impact on their life since the suicide was attempted were asked. The questionnaires utilized to gather the information from 36 young boys and girls ranging within the age group of 15 to 21 years from different schools, colleges and universities of Kashmir based on simple random sampling. In addition to this, information was gathered on the basis of in-depth interviews from few relevant field experts.



ETHICAL CONSIDERATIONS

For the pursuit of this study, prior and informed consent from the participants was prioritized in a formal way. The anonymity and confidentiality of the participants was assured and ensured positively so that the integrity of the participants must be respected. The participants were symbolized with pseudonyms and numbers and they were also assured that the information provided by them would not be used for any personal gain or any other purpose. Lastly, all the interviewed audio clips were permanently deleted soon after the completion of the data analysis.

RESULTS (with STATISTICS)

After scrutinizing the data, the data was condensed under three main themes based on review of literature and interviews with the experts in the field. (a) The Online Identity Construction and Disassociation with Real Life: Virtual Identity and Virtual Reality, (b) Virtual Mode and Suicide Risks, and (c) Virtual Mode and Suicide Prevention are the three main themes that were identified.

The Online Identity Construction and Disassociation with Real Life: Virtual Identity and Virtual Reality

There is a connection between trust and privacy in the competing tendency to structure the conditions and limits of the online identity construction. The issue is thus to understand the theoretical and practical tension between trust and privacy in the light of that online identity construction. Trust can be actually viewed as a way to mold our networked reality, that is, the reality within which we construct and project our own online personal identities. Disclosing personal identity in the networked world is likely to have consequences in our real life (P21 & P34). Therefore, in particular, disclosing personal data makes people infringe privacy rights, and this violation in turn impairs the construction of personal identity. So, in the online construction of personal identity, a tension between trust and privacy seems to belong to the notions of trust and privacy themselves {such as online reputation (Sartor, 2006)}. This construction is not based on self-transparency nor does it make us transparent to others, since it requires us to shape the conditions and limits in which we are "revealed" to others. In this respect, a philosophical notation is to be made: as suggested by the Latin origins of the word "re-velare" that is to reveal, means both to unfold (i.e., to remove the veils) and to hide something (i.e., to multiply the veils) (Lévinas, 1961). This signifies that the identity construction is not simply determined by the disclosure of information (that bears on trust) but is revealed by a multifaceted selection of information (a combination of disclosure and closure) that bears on trust and privacy. In this study, it was found that the construction of personal identity is always the result of a competition (both internal with ourselves and external with others) between what is disclosed and what is hidden about us: we do not have to forget that a society cannot exist without some spheres of



secrets, as (**P5**) explained. From this standpoint, personal identity is to be understood as the unending result of a selection of information that forges a **meaningful difference** (i.e., the Self) between what we wish to unfold and what we wish to keep secret (**P14**). The space of privacy is given by the contexts of communication connecting us to the rest of society in terms of negotiated identities. In such contexts, to trace the line between the private and the public sphere of life is a matter of power. In this study, it was also found that modern information and communications technology affects changes in identities in a way that have not been experienced before in the history of humankind. The definition of 'virtual' is near and reality is what we experience as human beings, as clarified by one of the participants (**P29**). Social changes and identities are determined by technological innovations that expeditiously convey information and embody social and cultural dimensions decisively shaping culture through a new communication system. Thereby, a new culture is emerging – the culture of real virtuality in which reality itself is fully immersed in a virtual context on the screen through which communication occurs becoming a real experience promoting the emergence of virtual identity.

Virtual Mode and Suicide Risks

There is increasing evidence that the online domain (virtual medium/internet) and social networked media influences suicide-related behavior. The role that the Internet, particularly social media, might have in suicide-related behavior is a topic of growing interest and debate. The recent increase in highly publicized cases of suicide that involve social media has drawn national attention to this topic. Therefore, multiple studies have found a strong link between heavy social media usage and an increased risk for depression, anxiety, loneliness, self-harm, and even suicidal thoughts. Social media fuses technology with social interaction via Internet-based applications that allow the creation and exchange of user-generated content. Social media platforms, such as chat rooms, blogging websites (for example, Blogspot), video sites (for example, YouTube), social networking sites (for example, Facebook, Instagram, Snapchat), and electronic bulletin boards or forums, as well as e-mail, text messaging, and video chat, have transformed traditional methods of communication by allowing the instantaneous and interactive sharing of information created and controlled by individuals, groups, organizations, and governments.

Social Media Users Demographics (2022): The popular social networking site Facebook had close to 2.74 billion, Youtube with 2.291 billion, WhatsApp with 2 billion, Facebook Messenger 1.3 billion, Instagram with 1.221 billion, WeChat with 1.213 billion, Tiktok 689 million, Telegram 500 million, Snapchat 498 million active users by August 2021 (Karl, 2021).



1. Facebook Demographics: Given that Facebook is the number 1 platform for adults.

Active monthly users: 2.7 billion monthly active users

Time: On average, Facebook users spend 35 minutes a day on the platform

Age of internet users who use Facebook:

86% of people age ranges from 18-29 years

77% of people age ranges from 30-49 years

51% of people age ranges from 50-65 years

34% of people that are 65+ years old

Gender:

54% of Facebook users are females

46% of Facebook users are males

Devices:

96% of users access Facebook via mobile devices

25% of users access Facebook via laptop or desktop

2. <u>YouTube Demographics</u>: YouTube has 2 billion monthly active users.

Active monthly users: YouTube has 2 billion monthly active users

Time: On average, YouTube users spend 11 minutes and 43 seconds per day on the platform

Age of internet users who use YouTube:

81% of people age ranges from 15-25 years

71% of people age ranges from 26-35 years

67% of people age ranges from 36-45 years

66% of people age ranges from 46-55 years

58% of people that are 56+ years old

Gender:



Over 50% of YouTube users are females

Over 50% of YouTube users are males

Devices:

Over 70% of YouTube views are on mobile devices

3. <u>Instagram Demographics</u>: Instagram is continuing to grow its user base with 1.2 billion people every month.

Active monthly users: 1.2 billion monthly active users

Time: On average, Instagram users spend 53 minutes a day on the platform

Age of internet users who use Instagram: 67% of people age ranges from 18-29 years

47% of people age ranges from 30-49 years

23% of people age ranges from 50-65 years

8% of people that are 65+ years old

Gender:

51% of Instagram users are females

49% of Instagram users are males

4. <u>SnapChat Demographics</u>: Snapchat has 381 million monthly active users.

Active monthly users: SnapChat has 381 million monthly active users

Time: On average, SnapChat users spend 30 minutes per day on the platform

Age of internet users who use SnapChat:

53% of people age ranges from 15-25 years

34% of people age ranges from 26-35 years

18% of people age ranges from 36-45 years

11% of people age ranges from 46-55 years

4% of people that are 56+ years old

Gender:



Over 61% of SnapChat users are females

Over 38% of SnapChat users are males

Devices: SnapChat is used on mobile devices only and this application is in 2nd place for overall mobile usage

5. Twitter Demographics: Twitter has 330 million monthly active users.

Active monthly users: 330 million monthly active users

Time: On average, Twitter users spend 3.39 minutes per session on the platform

Age of internet users who use Twitter: 38% of people age ranges from 18-29 years

26% of people age ranges from 30-49 years

17% of people age ranges from 50-65 years

7% of people that are 65+ years old

Gender:

50% of Twitter users are females

50% of Twitter users are males

6. <u>Pinterest Demographics</u>: Pinterest has 322 million monthly active users.

Active monthly users: 322 million monthly active users

Time: On average, Pinterest users spend 14.2 minutes per visit on the platform

Age of internet users who use Pinterest:

34% of people age ranges from 18-29 years

35% of people age ranges from 30-49 years

27% of people age ranges from 50-64 years

15% of people that are 65+ years old

Gender:

70% of Pinterest users are females

30% of Pinterest users are males



Devices:

80% of users access Pinterest via mobile devices

7. <u>LinkedIn Demographics</u>: LinkedIn has 260 million monthly active users.

Active monthly users: 260 million monthly active users

Time: On average, LinkedIn users spend 6 minutes and 7 seconds per visit on the platform

Age of internet users who use LinkedIn:

21% of people age ranges from 18-24 years

60% of people age ranges from 25-34 years

17% of people age ranges from 35-54 years

3% of people that are 55+ years old

Gender:

43% of LinkedIn users are females

57% of LinkedIn users are males

Devices:

57% of users access LinkedIn via mobile devices

(World Internet Statistics Report, 2022)

In today's digital world, many of us rely on social media platforms to find and connect with each other. While each has its benefits, it is important to remember that social media can never be a replacement for real-world human connection. In this study, it was reported by a field expert (guidance counselor) that 'this addiction lies in the fact that adolescents are in a transition period, which overtakes them during puberty, and then adolescents develop anti-social ideas, which can become ingrained and remain as a trace that have harmful enduring effects'. 'This contributes to the unreal virtual environment which often creates an abnormal psychological state that is alienated from real life, so that individuals adapt to the reel-life environment and cannot adept to the real-life situations', as explained by a psychologist (field expert). 'Ironically for a technology that is designed to bring people closer together, spending too much time engaging with internet/social media addiction actually makes them feel more lonely and isolated—and exacerbate mental health problems such as behavioral changes, social communication disorders, anxiety and depression which increases suicidal tendencies and ultimately leads to suicides', was revealed by other field expert (mental health counselor). Suicide affects all age groups in the population, but worldwide, rates clearly rise with increasing age. Lower the suicide rates is



among the younger age groups, suicide is the second leading cause of death among 15–29 years old globally (WHO, 2018). Suicide under the age of 5 is hard to find. A study on youth suicide refers to school-age children (7–12 years) and adolescents (13–20 years) (Orbach, 2006). This study further unfolds that we as youngsters have to make decisions about important concrete directions in life, for example choice of school/college/university, dealing with living situation events, tackling family conflicts and sexual temptation, choosing peer group/friend circle/life partner, career choices/ways of earning money (for buying house for the family or for marrying sisters or balancing the health/medicinal expenses of parents etc.) and all these bring thoughts of confusion and tensions, as (P9 & P28) asserted. Also, (P2 & P17) added to it, 'virtual (online) identity pacifies the struggles we face like that of – academic problems, obesity, bullying, body shaming, racism, drug addiction, sexual abuse, peer pressure, comparison and competition, stammering, stress, uncertainty, chaotic home environment, depression, anxiety, sleep disorders, impulsivity and loneliness'. Another field expert (NGO chairperson) briefed, 'they also have to address new challenges with regard to building their own identity, developing self-esteem, acquiring increasing independence and responsibility, building new intimate relationships, etc. In the meantime they are subject to ongoing, changing psychological and physical processes themselves. And besides that they are often confronted with high expectations, sometimes too high, from the family first, then significant relatives and peers. Such situations inevitably provoke a certain degree of helplessness, insecurity, stress and a sense of losing control. Therefore, these young people are by nature vulnerable to mental health problems, especially during the years of adolescence'. One of the child expert and clinical psychologist was furthermore of the opinion that 'the addictiveness, immersion and role-playing in many online gaming applications and social networking sites allow children and adolescents to create their own character and identity, leading them often in a fantasy world that heavily influence their actions within. Also, they get highly attached to this virtual identity and character playing as they get associated with the virtual world they live in. Sadly, they become over-attached to these fantasy worlds which further leads to neglect their real world responsibilities like lack of social engagement, behavioral problems, inclination towards negativity and bad habits, disinterest in all aspects of life and avoidance of day to day important tasks'. Literatures also describe social media as being more addictive than substances like alcohol and cigarette (RSPH, 2017). These addictions imbalances the mental stability and has detrimental consequences leading to suicidal ideation. 'The risk factors associated with suicide are family history of suicide and child maltreatment, family history of alcohol/substance abuse and mental illnesses particularly depression, previous attempts at suicide, impulsive and aggressive behavioral tendencies, feelings of hopelessness, isolation, loss of loved ones, job or financial difficulties, physical illness, lack of access to mental health care, conduct disorder, interpersonal conflict, anti-social behavior, abuse and stigma that hinders one from seeking help', as was proclaimed by a Juvenile **Justice Board (JJB) Chairperson** (as field expert).

The fear of missing out (FOMO) has been around far longer, sites such as Facebook, SnapChat and Instagram seem to exacerbate feelings that others are having more fun or living better lives than the one is. The idea that one is missing out on certain things impacts self-esteem, triggers



anxiety, and fuels even greater social media usage. A participant (P12) who frequently after every 2 seconds is a phone user narrated, 'FOMO compels you to pick up your phone every few minutes to check for updates, or compulsively respond to each and every alert—even if that means taking risks while you are driving, missing out on sleep at night, or prioritizing social media interaction over real world relationships'. Another participant (P24) declared, 'it results in the constant desire to be everywhere, every events that are taking place, the obsessive desire to always stay connected with what others are doing'. 'FOMO often affects both mental and physical health, and it results in the feeling of inferiority, life dissatisfaction, mood swings, low self-esteem and increased negative feelings. The comparisons of your own real life with othersincline towards depression increasing the suicide risks. High usage of online networks intensifies the feelings of loneliness lessening the essence of social relationships. Consequently, more dependence on online world grows more expectation from online connections and contacts. If the expectations are not fulfilled, disappointments taking place again upsurge to suicide', as was described by a psychiatrist (field expert). 'Human beings need face-to-face contact to be mentally healthy. Nothing reduces stress and boosts your mood faster or more effectively than eye-to-eye contact with someone who cares about you. The more you prioritize virtual mode interaction over in-person relationships, the more you are at risk for developing or exacerbating mood disorders such as staying lonely, being helpless and hopeless, anxiety and depression. Sharing endless selfies and all your innermost thoughts on social media creates an unhealthy selfcenteredness and distance you from real-life connections', a social worker expressed. Virtual identity via social media also encourages attitudes that are unhealthy to mental health such as unhealthy comparisons, jealousy, emulations, and counterfeit appearances. Most people put up only the best version of their lives on social media (Berla, 2018) and with this torture others who follow them and aspire to be like them. It has encouraged the living of fake lives just for social media presence.

Cyberbullicide is suicide which results from cyber bullying. Cyber bullying has led to suicide and suicidal behaviors among so many adolescents in Kashmir. Victims of cyber bullying are at a higher risk of experiencing self-harm and suicidal behaviors. According to the official data accessed, cyber bullying in Kashmir, in the year 2020, the **cybercrime department** received 150 complaints from women between the age group 18-30 years. Many of these girls slip into depression that ruined their life, as was reported by an official. A total of 412 complaints of cyber abuse between March and April 2020 was received, out of which 96% complaints were from women. Cybercrimes against women had been on the rise especially after the Covid19 related lockdowns. The incidents of cybercrime doubled according to the data from National Commission for Women (NCW) which ranged from abuse, indecent exposure, unsolicited obscene pictures, threats, sexting, malicious emails claiming their account was hacked, ransom demands, cyber stalking, cyber harassment and blackmailing. 'Cyber violence against women is raising in Kashmir mirrors the growing violence in everyday spaces. Teenagers who experienced any form of bullying including cyber bullying are at a higher risk of anxiety, sleep deprivation, poor academic performance, dropping out of school and depression. Thousands of young girls who have been victims of cybercrime do not come forward to lodge complaints as they lack



awareness and fear society', as was said by a Women Rights Activist. A research revealed that students who experience any form of bullying and cyber bullying are twice more likely to attempt suicide (Hinduja & Patchin, 2018). Body image dissatisfaction is the feeling and negative attitude of youngsters have about their body which is usually influenced by certain factors such as the cultural norms relating to an ideal body, personal perceptions towards weight gain, and body appearance. Overweight-obesity is a mounting public health problem in Kashmir Valley in school children aged 5-15 years age group and young adults aged 20-40 years. Body image dissatisfaction occurs in both male and female although it tends to be more common infemales, both genders are exposed to images online which they tend to fix as their perfect and ideal body, as recounted by an **endocrinologist**. In this study, participants (**P7 & P26**) disclosed that body image dissatisfaction often results in us feelings of low self-esteem, depression, low body confidence and eating disorders. Correlating marriage and physical appearance, forces us for gyming. Concerns with our body image lead us towards anxiety and suicidal thoughts. And also body shamming patterns of mock and taunts adds fuel to our helplessness which comes firstly from our family and then from relatives, neighbors, peers and matchmakers even. In a study, social media was revealed to influence the attitude of young women and adolescent girls causing them to engage in social comparisons which often leads to the feeling of inadequacy and body dissatisfaction. The activities and images portrayed by celebrities and social media influencers play a huge role in shaping standards for young people as they strive to emulate their admirers online (Alperstein, 2015). Results from other study, revealed a link between suicide ideation and how both male and female adolescents perceive their body image (Kim, 2009). Nowadays, in the age of the internet, young people effortlessly access and share content across the globe in the snap of a finger using varying platforms including but not exclusive to collaborative projects (e.g. Wikipedia and social bookmarking), blogs and microblogs (e.g. Twitter), content communities (e.g. YouTube), social networking sites (e.g. Facebook, WhatsApp), virtual game and social worlds (Robinson et al., 2015). Rather, these avenues have been used by youth to find out about suicide and varying means of perpetrating it as well as making suicide pacts with other distressed individuals. Sometimes, suicide is not acknowledged or reported, due to its sensitive nature and the taboo that still surrounds it.

In this study, it is also observed that suicide is associated with impulsivity. Although a suicidal process can take weeks, months or even years, the fatal transition from suicidal ideation and suicide attempts to an actual completed suicide often occurs suddenly, unexpectedly and impulsively, especially among adolescents. Difficulties in managing the various, often strong and mixed emotions and mood fluctuations accompanying the confrontation with new and everchanging challenges in different domains is another risk factor. Young people who had committed suicide were found to have had poorer problem-solving skills than their peers. Their behavior was characterized by a rather passive attitude, waiting for someone else to solve the problem for them, for simple problems as well as for more complex interpersonal problems. As lamented by two participants (**P18 & P31**), the inability in problem solving and mood regulation often caused insecurity, low self-efficacy and self-esteem, which also led to anger and aggressive behavior, emotional crisis and suicidal crisis, especially in combination with perfectionist



personalities. One of the most important sources of support with addressing the many challenges of youth is the family context in which young people live or have grown up. Several risk factors concerning family structure and processes have been linked to suicide behavior in numerous studies (Brent & Mann, 2006). From this study, it was estimated that in 50% of youth suicide cases, family factors were involved. One important factor was a history of continuous family conflicts. It was not clear whether these directly influenced the suicidal behavior of the child, or rather indirectly, through mental disorders evoked in the child as a result of the family context.

Poor communication within the family was also found in many cases of suicide. Direct conflicts with parents had a great impact, but also the absence of communication and neglect of communication needs enhanced the consequences. Furthermore, violence at home often seemed to be found in the background history of young suicide cases, not only specifically against the child, but more as a way of dealing with problems between family members. Parental divorce was also associated with suicide of the children involved, and this association was probably confounded by the practical, financial and socio-economic implications of living in a single-parent family system.

In the context of addressing new challenges, building their own identity and establishing self-confidence, most young people attach great importance to being part of peer groups, developing new intimate relationships, establishing confidence and security. Therefore, it is very surprising that interpersonal losses such as teenage relationship break-ups, the death of friends and peer rejection had a great impact in youth, and around one-fourth of youth were found suicidal cases. Another important suicide related stressors was linked to the important domains of school and family. School problems and academic stress was found in 16% of suicide cases. Youngsters who were "drifting," neither attending schools nor doing anything concrete, had substantially more risk of suicide, as on concluding the context of this study.

Virtual Mode and Suicide Prevention

In this study, the other side of the context determined that while virtual interaction on social media does not have the same psychological benefits as face-to-face contact, there are still many positive ways in which it helped to stay connected and acted as a supportive bridge for one's wellbeing. From the data analysis, it was evident that social media enabled many participants a sigh of relief also thus decreasing the suicidal thoughts in the following manner: This medium helped us to communicate and stay up to date with our family members – (especially grandparents, father, siblings), relatives and friends around the world who are living at a distance away from us, as was positively remarked by one of the participants (P36). The elderly persons who are left alone in their homes seek emotional support during tough times from this virtual mode/online domain social networks, as was added by P36. The participant (P1) pointed out that we find a platform for our creativity and self-expression in the form of online singing/dancing portals, poetry platforms, painting podiums etc. and we also discover sources of valuable information for educational purposes and learning. One of the expert as Legal Associate highlighted that 'Social networking sites for suicide prevention facilitates social connections



among peers with similar experiences and increases awareness of prevention programs, crisis helplines and other support. YouTube also has many videos devoted to suicide prevention featuring suicide survivor stories presented by animated avatars (a graphical representation of the user or the user's alter ego or character). Site users can create and design the appearance of their avatars, write a description about their personal experiences with suicide, and then record their voices or choose a computer-generated voiceover to narrate their stories. The use of this form of social media provides an anonymous, personalized, and interactive experience geared toward suicide prevention'.

SUGGESTIONS

Considering the potential negative effects of virtual identity and social media, it is important to develop research and interventions related to educational and support actions for youth, parents and educators. The incorporation of creative and attractive virtual strategies into conventional care be accessible, facilitate youth participation, exchanges of experiences, expression and identification of emotions and needs, especially providing social and moral support by creating support groups. It is important to invest in research, technological/creative innovations with accessible, efficient and adapted care and educational actions for diverse public using the social media in positive and safe way for the prevention of suicide and the promotion of mental health. To address these challenges and successfully cope with these emotions, young people must have access to significant supporting resources such as a stable living situation, intimate friendships, a structural framework and economic resources. Risk factors can be seen as factors that undermine this support or hinder access to these resources, while protective factors strengthen and protect these resources, or serve as a buffer against risk factors.

CONCLUSION

The internet has heralded an age of global interconnection via social media and this wave of modernization has become ingrained in almost all human endeavors leaving an indelible mark of positives as well as negatives on the very fabric of society. In this time, suicide and suicidal behavior have snowballed especially amongst young people, the most avid social media users. There is an independent association between problematic use of social media/internet and suicide attempts in young people. To protect privacy, that is, to construct a personal identity, is to protect the power of self-identification, which, however, always exists within the relation of mutual implication between self and significant others in a determined context of communication. The power of self-identification is confronted with the power of being identified by someone else. Those who affirm and those who refuse to acknowledge that social networks (or the Internet) are online spaces where people are given the possibility to endorse a second life or a new personality are both wrong, because they do not realize that social networks (or the Internet) constitute only a different way to intertwine reality and imagination in the construction of personal identity. Placed against the backdrop of the intertwinement of reality and ideality, the Self experiences



itself as a dynamic reality has to be constructed within the different and particular networked contexts of communication that form such backdrop. The field experts on this particular study highlighted numerous side-effects of screen-based technology, social media usage and mobile phone addiction on children's and adolescents psychology in Kashmir. If one is spending an excessive amount of time on social media and feelings of sadness, dissatisfaction, frustration, or loneliness are impacting their life, it may be time to re-examine their online habits and find a healthier balance to live a happier and peaceful life.

REFERENCES

- 1. Alperstein, N. (2015). Social comparison of idealized female images and the curation of self on Social Media. The Journal of Social Media in Society; 4:5-27.
- **2.** Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. American Psychologist; 55:469-480.
- **3.** Berla, N. (2018). How social media is affecting your mental health and needs to be addressed. The Economic Times. Available from: https://economictimes.indiatimes.com/magazines/panache/between-the lines/articleshow/62550811.cms
- **4.** Boyd, D. and Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. Journal of Computer-Mediated Communication; 13 (1).
- **5.** Brent, D. and Mann, J. (2006). Familial factors in adolescent suicidal behavior. In: King, R. and Apter, A., editors. Suicide in Children and Adolescents. Cambridge: Cambridge University Press; 86–117.
- **6.** Burns, R. B. (1993). Konsep Diri: Teori, Pengukuran, Perkembangan, dan Perilaku, Jakarta: Penerbit Arcan; 87.
- 7. Canale, N., Vieno, A., Doro, M., Mineo, E.R., Marino, C. and Billieux, J. (2019). Emotion-related impulsivity moderates the cognitive interference effect of smartphone availability on working memory. Scientific Reports Journal; 9:185-189.
- **8.** Castells, Manuel. (1996). The Information Age: Economy, Society and Culture. Vol. I: The Rise of Network Society. Oxford: Blackwell.
- **9.** Castells, Manuel. (1997). The Information Age: Economy, Society and Culture. Vol. II: The Power of Identity. Oxford: Blackwell.
- **10.** Castells, Manuel. (1998). The Information Age: Economy, Society and Culture. Vol. III: End of Millennium. Oxford: Blackwell.
- **11.** Cheng, Y. S., Tseng, P. T., Lin, P. Y., Chen, T. Y., Stubbs, B., Carvalho, A. F., Wu, C. K., Chen, Y. W. and Wu, M. K. (2018). Internet addiction and its relationship with suicidal behaviors: A meta-analysis of multinational observational studies. Journal of Clinical Psychiatry; 79: 9291.
- **12.** Daine Kate, Hawton Keith, Singaravelu Vinod, Stewart Anne, Simkin Sue and Montgomery Paul. (2022). The power of the web: a systematic review of studies of the influence of the internet on self-harm and suicide in young people. PLoS ONE, 8(10), Article e77555.



- https://doi.org/10.1371/journal.pone.0077555
- **13.** Durante, Massimo. (2011). The Online Construction of Personal Identity through Trust and Privacy. Information; 2:594-620. Doi:10.3390/info2040594
- 14. Erickson, E. H. (1959). Identity and the life cycle. New York: Norton.
- **15.** Finkenauer, C., Engels, R. and Baumeister, R. (2005). Parenting behavior, adolescent behavior and emotional problems: The role of self-control. International Journal of Behavioral Development, 29:58–69.
- **16.** Foucault, Michel. (1980). Power/Knowledge: Selected Interviews and Other Writings. New York: Pantheon Books.
- **17.** Foucault, Michel. (1994). The Order of Things: an Archaeology of the Human Sciences. New York: Vintage Press.
- 18. Global Digital Report: An Overview. (2022). New York: US.
- **19.** Goffman, Erving. (1959). The Presentation of Self in Everyday Life. US: Doubleday Publisher.
- **20.** Hand, M. and Sandywell, B. (2002). E-topia as cosmopolis or citadel: On the democratizing and de-democratizing logics of the Internet, or, toward a critique of the new technological fetishism. Theory, Culture & Society; 19(1–2): 197–225.
- **21.** Harter, S. (1999). The construction of the self. New York: The Guilford Press.
- 22. Heidegger, Martin. (1927). Being and Time. New York: SUNY Press.
- **23.** Hinduja, S. and Patchin, J. (2018). Connecting adolescent suicide to the severity of bullying and cyber bullying. Journal of School Violence; 18:1-14. DOI:10.1080/15388220.2018.1492417
- **24.** Hurlock, E. B. (1979). Personality Development. New York: Megraw-Hill Kogakusha; 93-95.
- **25.** Jerslid, A. T. (1963). The Psychology of Adolescence. New York: The Macmillan Company; 98.
- **26.** John Ann, Glendenning Alexander Charles, Marchant Amanda, Montgomery Paul, Stewart Anne, Wood Sophie, Lloyd Keith and Hawton Keith. (2018). Self-harm, suicidal behaviours and cyber bullying in children and young people: A systematic review. Journal of Medical Internet Research; 20:e129.
- 27. Karl, Daniel. (2021). Global Social Media Statistics: Data Reportal. New York: US.
- **28.** Kim, D. S. (2009). Body image dissatisfaction as an important contributor to suicidal ideation in adolescents: Gender differences and mediation of parent and peer relationships. The Journal of Psychosomatic Research; 66(4):297-303. Doi: 10.1016/j.jpsychores.2008.08.005
- **29.** Lawless, B. (2015). Performing Identity in "Transforming Poverty Partnerships": An Extension of Critical Discourse Analysis. Howard Journal of Communications. 2610.1080/10646175.2015.1049758
- **30.** Lévinas, E. (1961). Totalité et infini. Essai sur l'extériorité; M. Nijhoff: The Hague, The Netherland.
- 31. Marcella, R. (2001). Women on the Web. Journal of Documentation; 58(1):79-103.



- **32.** Marcia, J. E. (1966). Development and validation of ego-identity status. Journal of Personality and Social Psychology; 3:551-558.
- **33.** Marcia, J. E. (1980). Identity in adolescence. In J. Adelson (Ed.), Handbook of adolescent psychology. New York: Wiley & Sons; 159-187.
- **34.** Mars Becky, Heron Jon, Klonsky E. David, Moran Paul, O'Connor C. Rory, Tilling Kate, Wilkinson Paul & Gunnell David. (2019). Predictors of future suicide attempt among adolescents with suicidal thoughts or non-suicidal self-harm: A population based birth cohort study. Lancet Psychiatry; 6:327.
- 35. Mead, G. H. (1934). Mind, self, and society. Chicago: University of Chicago Press.
- **36.** Mihailidis, P. (2014). A tethered generation: Exploring the role of mobile phones in the daily life of young people. Mobile Media & Communication; 2(1):58-72.
- **37.** Orbach, I. (2006). Suicide prevention for adolescents. In: King R., Apter A., editors. Suicide in Children and Adolescents. Cambridge: Cambridge University Press; 1–40.
- **38.** Patton George C., Coffey Carolyn, Sawyer Susan M., Viner Russell M., Haller Dagmar M., Bose Krishna, Vos Theo, Ferguson Jane and Mathers Colin D. (2009). Global patterns of mortality in young people: A systematic analysis of population health data. Lancet; 374: 881–892.
- **39.** Pegg, K. J., O'Donnell, A. W., Lala, G. and Barber, B. L. (2018). The role of online social identity in the relationship between alcohol-related content on social networking sites and adolescent alcohol use. Cyber psychology, Behavior and Social Networking Journal; 21(1):50-55.
- **40.** Reyna, V. F. and Farley, F. (2006). Risk and rationality in adolescent decision making: Implications for theory, practice, and public policy. Psychological Science in the Public Interest Journal; 7:1–44.
- **41.** Robinson J., Rodrigues M., Fisher S., Bailey B. and Herrman H. (2015). Suicide and suicide prevention. Shanghai Archives of Psychiatry; 27(1):27-35.
- **42.** Royal Society for Public Health (RSPH). (2017). Status of Mind, Social Media and Young People's Mental Health and Wellbeing. London: Royal Society for Public Health.
- **43.** Sampasa-Kanyinga H. and Lewis R. F. (2015). Frequent Use of Social Networking Sites Is Associated with Poor Psychological Functioning Among Children and Adolescents. Cyber-psychology, Behavioral Social Network Journal; Jul, 18(7):380-5. Doi: 10.1089/cyber.2015.0055
- **44.** Sartor, G. (2006). Privacy, Reputation and Trust: Some Implications for Data Protection. In EUI Working Paper, Series Law, European University Institute. Available online: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=891123
- **45.** Shavelson, R. J. and Bolus, R. (1982). Self-Concept: The Interply of Theory and Methods, Journal of Education Psychology; 74.
- 46. Slattery, Martin. (2003). United Kingdom: Nelson Thornes.
- **47.** Stiglic Neza and Viner Russell M. (2019). Effects of screen time on the health and wellbeing of children and adolescents: A systematic review of reviews. BMJ Open; 9:e023191
- **48.** Subrahmanyam, K., Greenfield, P., Kraut, R. and Gross, E. (2001). The impact of computer



- use on adolescents' development. Journal of Applied Developmental Psychology; 22:7-30.
- **49.** Sulimani-Aidan, Y., Melkman, E. and Hellman, C. M. (2019). Nurturing the hope of youth in care: The contribution of mentoring. American Journal of Orthopsychiatry, 89(2):134–143. https://doi.org/10.1037/ort0000320
- 50. Suryabrata Sumadi. (1982). Psikologi Kepribadian. Rajawali Press: Jakarta; 290.
- **51.** UNESCO. (2016). What do we mean by "youth"?, http://www.unesco.org/new/en/social-and-humansciences/themes/youth/youth-definition/
- **52.** Victor, S. E. and Klonsky, E. D. (2014). Correlates of suicide attempts among self-injurers: a meta-analysis. Clinical Psychology Review; 34:282–297.
- **53.** Vincent, R. C. and Basil, M. D. (1997). College Students' News Gratification, Media Use and Current Events Knowledge. Journal of Broadcasting and Electronic Media; 41:380-392.
- **54.** Wang, P., Zhao, M., Wang, X., Xie, X., Wang, Y. and Lei, L. (2017). Peer relationship and adolescent smartphone addiction: The mediating role of self-esteem and the moderating role of the need to belong. Journal of Behavioral Addiction; 6:708–717.
- **55.** Waterman, A. S. and Archer, S. L. (1990). A life-span perspective on identity formation: Developments in form, function and process. In: P. B. Baltes, D. L. Featherman and R. M. Lerner (Eds.), Life-span development and behavior. Hillsdale, NJ: Erlbaum; 29-57.
- **56.** Widyanto, L. and Griffiths, M. (2006). 'Internet addiction': A critical review. International Journal of Mental Health Addiction; 4:31–51.
- **57.** World Health Organization. (2017). Suicide Data, http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/
- **58.** World Health Organization Mental Health. (2018). Geneva: World Health Organization. Available online at: http://www.who.int/mental_health/en/
- **59.** World Internet Statistics Report: Usage and Population Stats. (August, 2022). UN Population Division: US.
- **60.** Young, K. S. (2004). Internet addiction: A new clinical phenomenon and its consequences. American Behavioral Scientist Journal; 48:402–415.