



# Analysing the Impact of Social Media on Students' Academic Performance: A Comparative Study of Extraversion and Introversion Personality

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**Abstract** The advent of technology in education has seen a revolutionary change in the teaching–learning process. Social media is one such invention which has a major impact on students' academic performance. This research analyzed the impact of social media on the academic performance of extraversion and introversion personality students. Further, the comparative study between these two personalities will be analysed on education level (postgraduate and undergraduate) and gender (male and female). The research was initiated by identifying the factors of social media impacting students' academic performance. Thereafter, the scale was developed, validated and tested for reliability in the Indian context. Data were collected from 408 students segregated into 202 males and 206 females. Two hundred and thirty-four students are enrolled in postgraduation courses, whereas 174 are registered in the undergraduate programme. One-way ANOVA has been employed to compare the extraversion and introversion students of different education levels and gender. A significant difference is identified between extraversion and introversion students for the impact of social media on their academic performance.

**Keywords** Social networking sites · Academic performance · Social media · Personality traits · Education levels · Extraversion and introversion · Gender

## Introduction

Social Networking Sites (SNS) gained instant popularity just after the invention and expansion of the Internet. Today, these sites are used the most to communicate and spread the message. The population on these social networking sites (SNS) has increased exponentially. Social networking sites (SNS) in general are called social media (Boyd & Ellison, 2008). Social media (SM) is used extensively to share content, initiate discussion, promote businesses and gain advantages over traditional media. Technology plays a vital role to make SM more robust by reducing security threats and increasing reliability (Stergiou et al., 2018).

As of January 2022, more than 4.95 billion people are using the Internet worldwide, and around 4.62 billion are active SM users (Johnson, 2022). In India, the number of Internet users was 680 million by January 2022, and there were 487 million active social media users (Basuray, 2022). According to Statista Research Department (2022), in India, SM is dominated by two social media sites, i.e. YouTube and Facebook. YouTube has 467 million users followed by Facebook with 329 million users.

Although almost all age groups are using SM platforms to interact and communicate with their known community (Whiting & Williams, 2013), it has been found that social media sites are more popular among youngsters and specifically among students. They use SM for personal as well as academic activities extensively (Laura et al., 2017). Other than SM, from the last two years, several online platforms such as Microsoft Teams, Zoom and Google Meet are preferred to organize any kind of virtual meetings, webinars and online classes. These platforms were used worldwide to share and disseminate knowledge across the defined user community during the pandemic. Social media sites such as Facebook, YouTube, Instagram, WhatsApp and blogs are

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comparatively more open and used to communicate with public and/or private groups. Earlier these social media platforms were used only to connect with friends and family, but gradually these platforms became one of the essential learning tools for students (Park et al., 2009). To enhance the teaching–learning process, these social media sites are explored by all types of learning communities (Dzoghbenuku et al., 2019). SM when used in academics has both advantages and disadvantages. Social media helps to improve academic performance, but it may also distract the students from studies and indulge them in other non-academic activities (Alshuaibi et al., 2018).

Here, it is important to understand that the personality traits of students, their education level and gender are critical constructs to determine academic performance. There are different personality traits of an individual such as openness, conscientiousness, extraversion and introversion, agreeableness and neuroticism (McCrae & Costa, 1987). This cross-functional research is an attempt to study the impact of social media on the academic performance of students while using extraversion and introversion personality traits, education levels and gender as moderating variables.

## Literature Review

There has been a drastic change in the internet world due to the invention of social media sites in the last ten years. People of all age groups now share their stories, feelings, videos, pictures and all kinds of public stuff on social media platforms exponentially (Asur & Huberman, 2010). Youth, particularly from the age group of 16–24, embraced social media sites to connect with their friends and family, exchange information and showcase their social status (Boyd & Ellison, 2008). Social media sites have many advantages when used in academics. The fun element of social media sites always helps students to be connected with peers and teachers to gain knowledge (Amin et al., 2016). Social media also enhances the communication between teachers and students as this are no ambiguity and miscommunication from social media which eventually improves the academic performance of the students (Oueder & Abousaber, 2018).

When social media is used for educational purposes, it may improve academic performance, but some associated challenges also come along with it (Rithika & Selvaraj, 2013). If social media is incorporated into academics, students try to also use it for non-academic discussions (Arnold & Paulus, 2010). The primary reason for such distraction is its design as it is designed to be a social networking tool (Qiu et al., 2013). According to Englander et al. (2010), the usage of social media in academics has more disadvantages than advantages. Social media severely impacts the academic performance of a student.

The addiction to social media is found more among the students of higher studies which ruins the academic excellence of an individual (Nalwa & Anand, 2003). Among the social media users, Facebook users' academic performance was worse than the nonusers or users of any other social media network. Facebook was found to be the major distraction among students (Kirschner & Karpinski, 2010). However, other studies report contrary findings and argued that students benefited from chatting (Jain et al., 2012), as it improves their vocabulary and writing skills (Yunus & Salehi, 2012). Social media can be used either to excel in academics or to devastate academics. It all depends on the way it is used by the students. The good or bad use of social media in academics is the users' decision because both the options are open to the students (Landry, 2014).

Kaplan and Haenlein (2010) defined social media as user-generated content shared on web 2.0. They have also classified social media into six categories:

- (1) *Social Networking Sites*: Facebook, Twitter, LinkedIn and Instagram are the social networking sites where a user may create their profile and invite their friends to join. Users may communicate with each other by sharing common content.
- (2) *Blogging Sites*: Blogging sites are individual web pages where users may communicate and share their knowledge with the audience.
- (3) *Content Communities and Groups*: YouTube and SlideShare are examples of content communities where people may share media files such as pictures, audio and video and PPT presentations.
- (4) *Gaming Sites*: Users may virtually participate and enjoy the virtual games.
- (5) *Virtual Worlds*: During COVID-19, this type of social media was used the most. In the virtual world, users meet with each other at some decided virtual place and can do the pre-decided things together. For example, the teacher may decide on a virtual place of meeting, and students may connect there and continue their learning.
- (6) *Collaborative Content Sites*: Wikipedia is an example of a collaborative content site. It permits many users to work on the same project. Users have all rights to edit and add the new content to the published project.

Massive open online courses (MOOCs) are in trend since 2020 due to the COVID-19 pandemic (Raja & Kallarakal, 2020). MOOCs courses are generally free, and anyone may enrol for them online. Many renowned institutions have their online courses on MOOCs platform which provides a flexible learning opportunity to the students. Students find them useful to enhance their knowledge base and also in career development. Many

standalone universities have collaborated with the MOOCs platform and included these courses in their curriculum (Chen, 2013).

Security and privacy are the two major concerns associated with social media. Teachers are quite apprehensive in using social media for knowledge sharing due to the same concerns (Fedock et al., 2019). It was found that around 72% teachers were reluctant to use social media platforms due to integrity issues and around 63% teachers confirmed that security needs to be tightened before using social media in the classroom (Surface et al., 2014). Proper training on security and privacy, to use social media platforms in academics, is needed for students and teachers (Bhatnagar & Pry, 2020).

The personality traits of a student also play a significant role in deciding the impact of social media on students' academic performance. Personality is a dynamic organization which simplifies the way a person behaves in a situation (Phares, 1991). Human behaviour has further been described by many renowned researchers. According to Lubinski (2000), human behaviour may be divided into five factors, i.e. cognitive abilities, personality, social attitudes, psychological interests and psychopathology. These personality traits are very important characteristics of a human being and play a substantial role in work commitment (Macey & Schneider, 2008). Goldberg (1993) elaborated on five dimensions of personality which are commonly known as the Big Five personality traits. The traits are "openness vs. cautious"; "extraversion vs. introversion"; "agreeableness vs. rational"; "conscientiousness vs. careless"; and "neuroticism vs. resilient".

It has been found that among all personality traits, the "extraversion vs. introversion" personality trait has a greater impact on students' academic performance (Costa & McCrae, 1999). Extrovert students are outgoing, talkative and assertive (Chamorro et al., 2003). They are positive thinkers and comfortable working in a crowd. Introvert students are reserved and quiet. They prefer to be isolated and work in silos (Bidjerano & Dai, 2007). So, in the present study, we have considered only the "extraversion vs. introversion" personality trait. This study is going to analyse the impact of social media platforms on students' academic performance by taking the personality trait of extraversion and introversion as moderating variables along with their education level and gender.

## Research Gap

Past research by Choney (2010), Karpinski and Duberstein (2009), Khan (2009) and Kubey et al. (2001) was done mostly in developed countries to analyse the impact of social media on the students' academic performance, effect

of social media on adolescence, and addictiveness of social media in students. There are no published research studies where the impact of social media was studied on students' academic performance by taking their personality traits, education level and gender all three together into consideration. So, in the present study, the impact of social media will be evaluated on students' academic performance by taking their personality traits (extraversion and introversion), education level (undergraduate and postgraduate) and gender (male and female) as moderating variables.

## Objectives of the Study

Based on the literature review and research gap, the following research objectives have been defined:

1. To identify the elements of social media impacting student's academic performance and to develop a suitable scale
2. To test the validity and reliability of the scale
3. To analyse the impact of social media on students' academic performance using extraversion and introversion personality trait, education level and gender as moderating variables

## Research Methodology

### Sampling Technique

Convenience sampling was used for data collection. An online google form was floated to collect the responses from 408 male and female university students of undergraduation and postgraduation streams.

### Measure

*Objective 1* To identify the elements of social media impacting student's academic performance and to develop a suitable scale.

A structured questionnaire was employed to collect the responses from 408 students of undergraduate and postgraduate streams. The questionnaire was segregated into three sections. In section one, demographic details such as gender, age and education stream were defined. Section two contained the author's self-developed 16-item scale related to the impact of social media on the academic performance of students. The third section had a standardized scale developed by John and Srivastava (1999) of the Big Five personality model.

## Demographics

There were 408 respondents (students) of different education levels consisting of 202 males (49.5%) and 206 females (50.5%). Most of the respondents (87%) were from the age group of 17–25 years. 234 respondents (57.4) were enrolled on postgraduation courses, whereas 174 respondents (42.6) were registered in the undergraduate programme. The result further elaborates that WhatsApp with 88.6% and YouTube with 82.9% are the top two commonly used platforms followed by Instagram with 76.7% and Facebook with 62.3% of students. 65% of students stated that Google doc is a quite useful and important application in academics for document creation and information dissemination.

## Validity and Reliability of Scale

*Objective 2* Scale validity and reliability.

Exploratory factor analysis (EFA) and Cronbach's alpha test were used to investigate construct validity and reliability, respectively.

The author's self-designed scale of 'social media impacting students' academic performance' consisting of 16 items was validated using exploratory factor analysis. The principle component method with varimax rotation was applied to decrease the multicollinearity within the items. The initial eigenvalue was set to be greater than 1.0 (Field, 2005). Kaiser–Meyer–Olkin (KMO) with 0.795 and Bartlett's test of sphericity having significant values of 0.000 demonstrated the appropriateness of using exploratory factor analysis.

The result of exploratory factor analysis and Cronbach's alpha is shown in Table 1. According to Sharma and Behl

**Table 1** Exploratory factor analysis and Cronbach's alpha for the self-developed scale of "Social media impact on academic performance"

Factors	Items retained in factor analysis	Factor loading
<b>Accelerating impact</b>		
My grades are improving with the help of study materials shared on social media platforms	Yes	0.918
For expressing our thoughts, social media platforms are the best means	Yes	0.913
Our teachers share assignments and class activities on social media platforms which eventually help us in managing our academics better	Yes	0.820
Academic discussions on public/private groups accelerate my understanding of the topics	Yes	0.562
<i>Eigenvalue: 3.275; Percentage of Variance: 20.472</i>		
<i>Cronbach's alpha: 0.819</i>		
<b>Deteriorating impact</b>		
My academic performance negatively affected due to unlimited use of social media	Yes	0.814
Distraction from studies is more when social media is added to academics	Yes	0.808
My grades have deteriorated since I am engaged on these social platforms	Yes	0.780
Addiction to social networking sites, affecting my academic performance	Yes	0.761
I have observed mood swings and irresponsible behaviour due to social media posts	Yes	0.631
<i>Eigenvalue: 3.967; Percentage of Variance: 24.795</i>		
<i>Cronbach's alpha: 0.876</i>		
<b>Social media prospects</b>		
Social media sites increase employment prospects	Yes	0.715
I use social networking sites (SNS) to spread and share knowledge with my classmate	Yes	0.686
Massive Open Online Courses (MOOCs) help me in the self-learning mode	Yes	0.679
I use materials obtained from social media sites to complement what has been taught in the class	Yes	0.634
<i>Eigenvalue: 1.416; Percentage of Variance: 8.851</i>		
<i>Cronbach's alpha: 0.711</i>		
<b>Social media challenges</b>		
Cyberbullying on social media platforms makes me anxious	Yes	0.834
Privacy and security on social networking sites are the biggest challenges in academics	Yes	0.736
Social media is a barrier for me to being engaged in face-to-face communication	Yes	0.528
<i>Eigenvalue: 1.303; Percentage of Variance: 8.143</i>		
<i>Cronbach's alpha: 0.701</i>		
<i>Total variance: 62.260</i>		

(2020), “High loading on the same factor and no substantial cross-loading confirms convergent and discriminant validity respectively”.

The self-developed scale was segregated into four factors, namely “Accelerating Impact”, “Deteriorating Impact”, “Social Media Prospects” and “Social Media Challenges”.

The first factor, i.e. “Accelerating Impact”, contains items related to positive impact of social media on students’ academic performance. Items in this construct determine the social media contribution in the grade improvement, communication and knowledge sharing. The second factor “Deteriorating Impact” describes the items which have a negative influence of social media on students’ academic performance. Items such as addiction to social media and distraction from studies are an integral part of this factor. “Social Media Prospects” talk about the opportunities created by social media for students’ communities. The last factor “Social Media Challenges” deals with security and privacy issues created by social media sites and the threat of cyberbullying which is rampant in academics.

The personality trait of an individual always influences the social media usage pattern. Therefore, the impact of social media on the academic performance of students may also change with their personality traits. To measure the personality traits, the Big Five personality model was used. This model consists of five personality traits, i.e. “openness vs. cautious”; “extraversion vs. introversion”; “agreeableness vs. rational”; “conscientiousness vs. careless”; and “neuroticism vs. resilient”. To remain focussed on the scope of the study, only a single personality trait, i.e. “extraversion vs. introversion” with 6 items was considered for analysis. A reliability test of this existing scale using Cronbach’s alpha was conducted. Prior to the reliability test, reverse scoring applicable to the associated items was also calculated. Table 2 shows the reliability score, i.e. 0.829.

**Objective 3** To analyse the impact of social media on students’ academic performance using extraversion and introversion personality traits, education level and gender as moderating variables.

The research model shown in Fig. 1 helps in addressing the above objective.

As mentioned in Fig. 1, four dependent factors (Accelerating Impact, Deteriorating Impact, Social Media Prospects and Social Media Challenges) were derived from EFA and used for analysing the impact of social media on the academic performance of students having extraversion and introversion personality traits at different education levels and gender.

Students having a greater average score (more than three on a scale of five) for all personality items mentioned in Table 2 are considered to be having extraversion personality or else introversion personality. From the valid dataset of 408 students, 226 students (55.4%) had extraversion personality trait and 182 (44.6%) had introversion personality trait. The one-way ANOVA analysis was employed to determine the impact of social media on academic performance for all three moderators, i.e. personality traits (Extraversion vs. Introversion), education levels (Undergraduate and Postgraduate) and gender (Male and Female). If the sig. value for the result is  $\geq 0.05$ , we may accept the null hypothesis, i.e. there is no significant difference between extraversion and introversion personality students for the moderators; otherwise, null hypothesis is rejected which means there is a significant difference for the moderators.

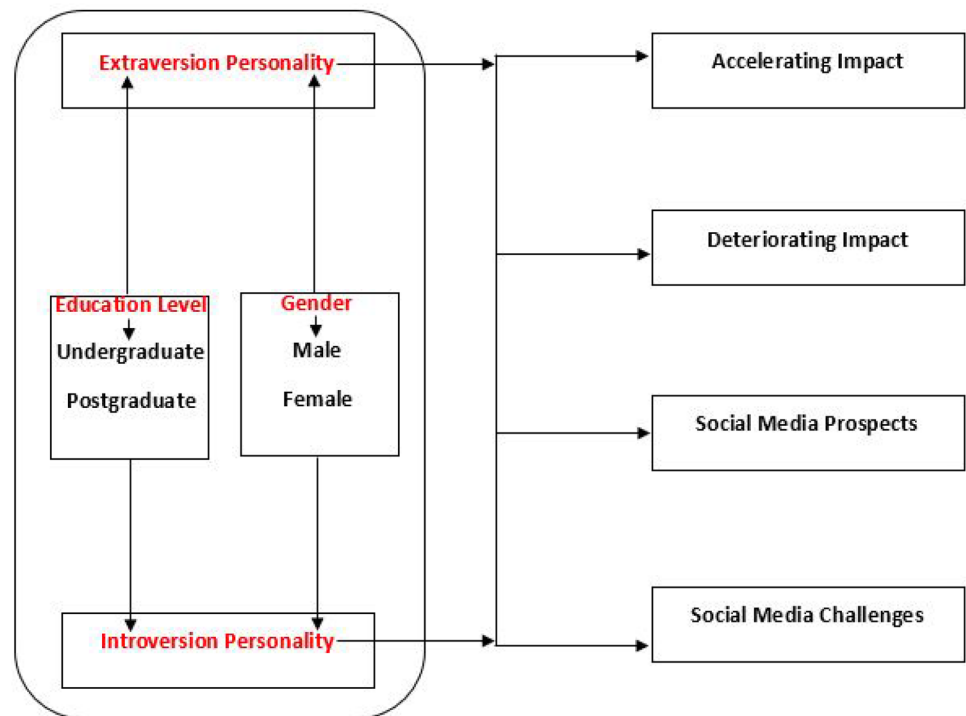
Table 3 shows the comparison of the accelerating impact of social media on the academic performance of all students having extraversion and introversion personality traits. It also shows a comparative analysis on education level and gender for these two personality traits of students. In the first comparison of extraversion and introversion students, the sig. value is 0.001, which indicates that there is a significant difference among extraversion and introversion students for the “Accelerating Impact” of social media on academic performance. Here, 3.781 is the mean value for introversion students which is higher than the mean value 3.495 of extraversion students. It clearly specifies that the accelerating impact of social media is more prominent in the students having introversion personality traits. Introversion students experienced social media as the best tool to express thoughts and improve academic grades. The result is also consistent with the previous studies where introvert students are perceived to use social media to improve their academic performance

**Table 2** Cronbach’s alpha test for the scale of extraversion vs. introversion personality traits

Personality traits	Cronbach’s alpha value
<i>Extraversion vs. introversion</i>	
I see myself as someone who is talkative	0.829
I see myself as someone who is reserved and quiet	
I see myself as someone who is full of energy and enthusiasm	
I see myself as someone who has an assertive personality	
I see myself as someone who is sometimes shy, self-conscious	
I see myself as someone who is outgoing, sociable	



**Fig. 1** Social media factors impacting academic performances of extraversion and introversion personality traits of students at different education levels and gender



**Table 3** One-way ANOVA: determining “Accelerating Impact” among extraversion and introversion personality traits students at different education levels and genders

Factor	Group	N	Mean	SD	F Stat	Sig.
Accelerating impact	Extraversion	226	3.495	0.8912	11.68	0.001
	Introversion	182	3.781	0.7997		
<i>Postgraduate students</i>						
Accelerating impact	Extraversion	129	3.643	0.741	7.388	0.007
	Introversion	105	3.901	0.7081		
<i>Undergraduate students</i>						
Accelerating impact	Extraversion	99	3.292	1.033	5.102	0.025
	Introversion	77	3.621	0.8862		
<i>Male students</i>						
Accelerating impact	Extraversion	115	3.578	0.9519	0.049	0.825
	Introversion	87	3.604	0.7651		
<i>Female students</i>						
Accelerating impact	Extraversion	111	3.418	0.8921	23.079	0
	Introversion	95	3.964	0.7377		

Significant at the 0.05 level

(Amichai-Hamburger et al., 2002; Voorn & Kommers, 2013). Further at the education level, there was a significant difference in postgraduate as well as undergraduate students for the accelerating impact of social media on the academic performance among students with extraversion and introversion, and introverts seem to get better use of social media. The gender-wise significant difference was also analysed between extraversion and introversion personalities. Female introversion students were found to gain

more of an accelerating impact of social media on their academic performance.

Like Table 3, the first section of Table 4 compares the deteriorating impact of social media on the academic performance of all students having extraversion and introversion personality traits. Here, the sig. value 0.383 indicates no significant difference among extraversion and introversion students for the “Deteriorating Impact” of social media on academic performance. The mean values show the moderating deteriorating impact of social media on the academic

**Table 4** One-way ANOVA: Examining “Deteriorating Impact” among extraversion and introversion personality traits students at different education levels and genders

Factor	Group	<i>N</i>	Mean	SD	<i>F</i> Stat	Sig.
Deteriorating impact	Extraversion	226	2.535	0.969	0.764	0.383
	Introversion	182	2.615	0.852		
<i>Postgraduate students</i>						
Deteriorating impact	Extraversion	129	2.547	0.9436	0.645	0.423
	Introversion	105	2.642	0.8342		
<i>Undergraduate students</i>						
Deteriorating impact	Extraversion	97	2.52	1.0065	0.168	0.682
	Introversion	77	2.579	0.8799		
<i>Male students</i>						
Deteriorating impact	Extraversion	115	2.722	0.9233	0.598	0.44
	Introversion	87	2.621	0.9155		
<i>Female students</i>						
Deteriorating impact	Extraversion	111	2.611	0.7943	4.545	0.034
	Introversion	95	2.342	0.9814		

Significant at the 0.05 level

performance of extraversion and introversion personality students. Unlimited use of social media due to the addiction is causing a distraction in academic performance, but the overall impact is not on the higher side. Further, at the education level, the sig. values 0.423 and 0.682 of postgraduate and undergraduate students, respectively, show no significant difference between extraversion and introversion students with respect to “Deteriorating Impact of Social Media Sites”. The mean values again represent the moderate impact. Gender-wise, male students have no difference between the two personality traits, but at the same time, female students have a significant difference in the deteriorating impact, and it is more on extroverted female students.

The significant value, i.e. 0.82, in Table 5 represents no significant difference between extraversion and

introversion personality students for the social media prospects. The higher mean value of both personality students indicates that they are utilizing the opportunities of social media in the most appropriate manner. It seems that all the students are using social media for possible employment prospects, gaining knowledge by attending MOOCs courses and transferring knowledge among other classmates. At the education level, postgraduation students have no significant difference between extraversion and introversion for the social media prospects, but at the undergraduate level, there is a significant difference among both the personalities, and by looking at mean values, extroverted students gain more from the social media prospects. Gender-wise comparison of extraversion and introversion personality students found no significant

**Table 5** One-way ANOVA: Examining “Social Media Prospects” among extraversion and introversion personality traits students at different education levels and genders

Factor	Group	<i>N</i>	Mean	SD	<i>F</i> Stat	Sig.
Social media opportunities	Extraversion	226	3.704	0.716	3.031	0.082
	Introversion	182	3.574	0.782		
<i>Postgraduate students</i>						
Social media prospects	Extraversion	129	3.893	0.6356	0.086	0.77
	Introversion	105	3.869	0.6308		
<i>Undergraduate students</i>						
Social media prospects	Extraversion	97	3.451	0.7418	5.717	0.018
	Introversion	77	3.172	0.7919		
<i>Male students</i>						
Social media prospects	Extraversion	115	3.713	0.655	1.487	0.224
	Introversion	87	3.589	0.7887		
<i>Female students</i>						
Social media prospects	Extraversion	111	3.694	0.7773	1.499	0.222
	Introversion	95	3.561	0.7793		

Significant at the 0.05 level

difference in the social media prospects for male as well as female students.

Table 6 shows the comparison of the social media challenges of all students having extraversion and introversion personality traits. It is also doing a comparative analysis on education level and gender for these two personality traits of students. All sig. values in Table 6 represent no significant difference between extraversion and introversion personality students for social media challenges. Even at the education level and gender-wise comparison of the two personalities, no significant difference is derived. The higher mean values indicate that the threat of cyberbullying, security and privacy is the main concern areas for extraversion and introversion personality students. Cyberbullying is seen to be more particularly among female students (Snell & Englander, 2010).

## Conclusion

The use of social media sites in academics is becoming popular among students and teachers. The improvement or deterioration in academic performance is influenced by the personality traits of an individual. This study has tried to analyse the impact of social media on the academic performance of extraversion and introversion personality students. This study has identified four factors of social media which have an impact on academic performance. These factors are: accelerating impact of social media; deteriorating impact of social media; social media prospects; and social media challenges.

Each of these factors has been used for comparative analysis of students having extraversion and introversion personality traits. Their education level and gender have also been used to understand the detailed impact between these

two personality types. In the overall comparison, it has been discovered that both personalities (extraversion and introversion) have a significant difference for only one factor, i.e. “Accelerating Impact of Social Media Sites” where students with introversion benefited the most. At the education level, i.e. postgraduate and undergraduate, there was a significant difference between extraversion and introversion personalities for the first factor which is the accelerating impact of social media. Here, the introversion students were found to benefit in postgraduate as well as undergraduate courses. For the factors of deteriorating impact and social media challenges, there was no significant difference between extraversion and introversion personality type at the different education levels.

Surprisingly, for the first factor, i.e. the accelerating impact of social media, in gender-wise comparison, no significant difference was found between extraversion and introversion male students. Whereas a significant difference was found in female students. The same was the result for the second factor, i.e. deteriorating impact of social media of male and female students. For social media prospects and social media challenges, no significant difference was identified between extraversion and introversion students of any gender.

## Findings and Implications

The personality trait of a student plays a vital role in analysing the impact of social media on their academic performance. The present study was designed to find the difference between extraversion and introversion personality types in students for four identified factors of social

**Table 6** One-way ANOVA: Examining “Social Media Challenges” among extraversion and introversion personality traits students at different education levels and genders

Factor	Group	<i>N</i>	Mean	SD	<i>F</i> Stat	Sig.
Social media challenges	Extraversion	226	3.273	0.889	0.707	0.401
	Introversion	182	3.2	0.857		
<i>Postgraduate students</i>						
Social media challenges	Extraversion	129	3.375	0.874	2.067	0.152
	Introversion	105	3.21	0.8737		
<i>Undergraduate students</i>						
Social media challenges	Extraversion	97	3.136	0.8946	0.134	0.714
	Introversion	77	3.186	0.8386		
<i>Male students</i>						
Social media challenges	Extraversion	115	3.322	0.8353	0.398	0.529
	Introversion	87	3.245	0.8767		
<i>Female students</i>						
Social media challenges	Extraversion	111	3.222	0.9421	0.263	0.608
	Introversion	95	3.158	0.8405		

Significant at the 0.05 level



media and their impact on students' academic performance. The education level and gender were also added to make it more comprehensive. The implications of this study are useful for institutions, students, teachers and policymakers.

This study will help the institutions to identify the right mix of social media based on the personality, education level and gender of the students. For example, technological challenges are faced by all students. It is important for the institutions to identify the challenges such as cyberbullying, security and privacy issues and accordingly frame the training sessions for all undergraduate and postgraduate students. These training sessions will help students with extraversion and introversion to come out from possible technological hassles and will create a healthy ecosystem (Okereke & Oghenetega, 2014).

Students will also benefit from this study as they will be conscious of the possible pros and cons that exist because of social media usage and its association with students' academic performance. This learning may help students to enhance their academic performance with the right use of social media sites. The in-depth knowledge of all social media platforms and their association with academics should be elucidated to the students so that they may explore the social media opportunities in an optimum manner. Social media challenges also need to be made known to the students to improve upon and overcome with time (Boateng & Amankwaa, 2016).

Teachers are required to design the curriculum by understanding the learning style of students with extraversion and introversion personality type. Innovation and customization in teaching style are important for the holistic development of students and to satisfy the urge for academic requirements. Teachers should also guide the students about the adverse impacts of each social media platform, so that these can be minimized. Students should also be guided to reduce the time limit of using social media (Owusu-Acheaw & Larson, 2015).

Policymakers are also required to understand the challenges faced by the students while using social media in academics. All possible threats can be managed by defining and implementing transparent and proactive policies. As social media sites are open in nature, security and privacy are the two major concerns. The Government of India should take a strong stand to control all big social media companies so that they may fulfil the necessary compliances related to students' security and privacy (Kumar & Pradhan, 2018).

The overall result of these comparisons gives a better insight and deep understanding of the significant differences between students with extraversion and introversion personality type towards different social media factors and their impact on students' academic performance. Students'

behaviour according to their education level and gender for extraversion and introversion personalities has also been explored.

## Limitation and Future Scope of Research

Due to COVID restrictions, a convenient sampling technique was used for data collection which may create some response biases where the students of introversion personality traits may have intentionally described themselves as extroversion personalities and vice versa. This study also creates scope for future research. In the Big Five personality model, there are four other personality traits which are not considered in the present study. There is an opportunity to also use cross-personality comparisons for the different social media parameters. The other demographic variables such as age and place may also be explored in future research.

**Author contributions** All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Dr. SS and Prof. RB. The first draft of the manuscript was written by Dr. SS, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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**Availability of data and material** Complete data and material is available to support transparency.

## Declarations

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Consent to participate** Verbal informed consent was obtained from the participants.

**Consent to publication** Verbal consent is obtained for publication

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