Intellectual Humility and Openness in Higher Education

A thesis submitted to Jadavpur University
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Doctor of Philosophy in Arts (Education)

Submitted by

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Under the supervision of

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Dedicated to my parents

Certificate

Certified that the thesis entitled "**Intellectual Humility and Openness in Higher Education**" submitted by me for the award of the Degree of Doctor of Philosophy in Arts (Education) at Jadavpur University is based upon my work carried out under the supervision of Prof. Muktipada Sinha, Professor & Head, Department of Education, Jadavpur University.

And neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere / elsewhere.

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Dated Kolkata, the 14th Day of March 2023 Bijoy Krishna Panda

List of tables

List of figures

List of acronyms

ERIC	Education Resources Information Center
EBSCOhost	EBSCO Information Services
IH	Intellectual Humility
DoS	Differentiation-of-Self
IC	Intercultural Competence
US / USA	United States of America
ERN	Error-Related Negativity
Pe	Error Positivity
IQ	Intelligence Quotient
SIH	Socio-political Intellectual Humility
CISH	Comprehensive Intellectual Humility Scale
UK	United Kingdom
16PF	The Sixteen Personality Factor Questionnaire
GPA	Grade Point Average
HEXACO-SPI	The HEXACO Supernumerary Personality Inventory
IGNOU	Indira Gandhi National Open University
OP	Openness
AISHE	All Indian Survey on Higher Education
UGC	University Grants Commission
BFI	The Big Five Inventory
APA	American Psychological Association
IBM	International Business Machines Corporation
SPSS	Statistical Package for the Social Sciences
JMP	John's Macintosh Project
df	Degree of Freedom
Mdn	Median
CI	Class Interval
HSD	Honestly Significant Difference
M	Mean
N	Sample Size

SD	Standard Deviation
ANOVA	Analysis of Variance
NAAC	National Assessment and Accreditation Council
WBUTTEPA	West Bengal University of Teachers' Training, Educational Planning and Administration
IIE	Independence of Intellect and Ego
OROV	Openness to Revising One's Viewpoint
ROV	Respect for Others' Viewpoints
LIO	Lack of Intellectual Overconfidence
VIF	Variance Inflation Factors
X^2	Chi Square
RMSEA	Root Mean Square Error of Approximation
CFI	Comparative Fit Index
TLI	Tucker-Lewis Index
SRMR	Standardized Root Mean Square Residual
OECD	The Organization for Economic Cooperation and Development

List of appendices

Abstract

We all have limitations in our thinking, but those who are aware of it are much fitter for any purpose. Openness to opposing views and recognizing the fact that one's beliefs and opinions might be incorrect is a quality we call intellectual humility which people are not born with, but the quality they can certainly gift to themselves. In other words, intellectual humility is recognizing the limits of one's own knowledge and at the same time appreciating others' intellectual strength. It is also the basis of critical thinking which help us to grow more congruent and tolerant rather than simply open-minded. Intellectual courage and intellectual empathy as subsets of intellectual humility strengthen peoples' cooperative behaviour and therefore, are necessary skills for realizing happiness in a democratic society. Research shows that more intellectual humility brings more tolerance as well as more openness, which can be learned and required for co-existence in society. Therefore, the integration of intellectual humility and openness is one of the desirable changes that we want to see in peoples' behaviour. The present study aimed at exploring the extent of both phenomena in stakeholders of higher education. A sample size of 880 students and 200 teachers from 100 colleges and 22 universities spread across 21 districts of West Bengal was studied using a cross-sectional survey method to obtain a good representation of the population in the said geographical region. The Comprehensive Intellectual Humility Scale and Openness questions from the Big Five Inventory were administered to find out the extent of intellectual humility and openness among the participants. Results showed that the students in higher education had a good deal of intellectual humility and openness while the teachers possessed more. Amount of intellectual humility and openness varied in terms of personal, socio-demographic, academic and behavioural characteristics of the participants as laid down in the study. It was also found that intellectual humility significantly predicted the openness of the participants. The study discussed on probable causes of the variation in both constructs in light of the different characteristics of the participants. In addition, it was concluded that intellectual humility and openness need to be realized as having a significant effect on our life and instrumental in bringing sustainability to today's knowledge society.

Contents

CHAPTER 1

CONTEXT OF THE STUDY

Chapter 1 Context of the Study

1.1 Introduction

Intellectual humility is the non-threatening awareness of one's tendency to make mistakes in thought processes and the willingness to accept being wrong without belittling the self. The limitation of one's own knowledge and not looking at ideas other than our own perspectives results in conflict, bias and agitation in mind eventually leading to societal acrimony. In the digital age of polarization, fake news and widespread misinformation, there is a possible antidote – intellectual humility i.e., critically evaluating information in non-biased ways which means understanding and recognizing of one's limitations and biases when making evidence-based decisions. Amazon Inc. CEO Jeff Bezos's advice on hiring was like magic – how hard the worker can work, how much work experience they have, are important but the most important is how much intellectual humility they possess. Google hiring head L. Bock also named intellectual humility as one of the company's five essential attributes, reflecting hat without intellectual humility "you are unable to learn" (Friedman, 2014). Those who have intellectual humility constantly revise their understanding even the problems that they have solved, they revisit the solution repeatedly, and they take challenges again and again in terms of new perspectives, new information, new ideas, conflict and their own way of thinking. Research shows that this quality of workers, as well as an individual, is very important. Reaching the top in any job requires the willingness to learn

and improve and to accept that not everyone will have all the answers. Therefore, most of multinationals prefer to hire people who have tried, failed, and learned from their mistakes. Through this, it can be understood how much a person can try for success which reflects their intellectual humility. Duke University Psychology Professor Mark Leary found in a study that intellectual humility gives people a strong advantage in reaching their goals. It always keeps them moving forward, despite may not be the most talked-about trait but an essential precursor to excellence in almost anything. Intellectual humility is reasonable in the sense that we are not right about most of the disagreements, often unreasonably overconfident, which is not correct.

"I could be wrong, but..." was a starter in almost every speech of Benjamin Franklin during his long political career in the United States which essentially turned the disagreement of people opposing his ideas and beliefs less personal (Snow, 2018). It has been seen since time immemorial that being open to ideas and experiences has far more consequences on society's progress and is likely to be associated with lesser agitation, unrest and doubts. Often leaders at scientific and administrative bodies put themselves in a mindset where new ideas and opposing views are welcomed and discussed, resulting in elevated performance and productivity. Religious leaders frequently perceives the confession of people for their transgression as an opportunity to revise the sinful soul and rebuild a better person (Hook et al., 2015). Medical professionals disconnect their ego and personal beliefs while treating severe health conditions and seek help from experts and advanced medical technologies to remain perseverant towards the patient's well-being. Even legal

practitioners search for criticisms and opinions from others in dealing with obscurity to maintain accountability of the judicial system (Miller, 2021). We have seen entrepreneurs like Ratan Tata, Bill Gates and Anand Mahindra who have always put forth the value of humility and generosity while approaching new ideas, irrespective of the source. The ancient Bhagavad Gita has also laid importance on being humble to remain pertinent to true knowledge and thereby obtain wisdom “The humble sages, by virtue of true knowledge, see with equal vision a learned and gentle brahmana, a cow, an elephant, a dog and a dog-eater..” (*Bhagavad Gita 5.18*, 2012).

As most of us see ourselves carrying vessels of knowledge, beliefs, attitudes and capabilities, which we are skeptical of being challenged, threatened and revised, we miss the opportunity to see the endless possibilities in the world. We make agreements with ideas that are close to our own, approach and make relations with people who are like us, do things we believe to be appropriate, stay among people who comfort us, and that is not wrong, per se. But in securing comfort, we make bubbles around us that we merely break apart and let others and their ideas in whether it be better than ours. This has happened everywhere since we started living in groups within a society, restricting it to the vow of norms and standards.

But evidence shows people with flexibility and openness frequently challenge their positions and renounce whatever they believe to be true in times of change, emergency and survival as they learn over time. These people make the most positive difference in the world and can discern when they need to change and be brave enough to do so even when the cost is high

(*Intellectual Humility*, n.d.-b). What leads them to do so, even in uncertain times, was a question asked for many decades in leadership, organizational behaviour, psychology and many others. And here comes the virtue of intellectual humility, where the above examples fit in. Being etymologically rooted in different philosophies around the world, this one quality we are to thrive for revising our viewpoints towards self and others (*Intellectual Humility*, n.d.-a).

1.2 Concept of intellectual humility

We see people with different traits and qualities, different perspectives and worldviews but in terms of cognitive decision-making, there are as few as three types of them. The first type, who denies changing their mindset, is overconfident about their own beliefs and feels superior in intellectual competencies, known as *intellectually arrogant*, and the second type, who incline to any sort of beliefs they encounter, is easily influenced by others' ideas, seeing their own intellectual position as negligible or worthless are labelled as *intellectually gullible*. The third type, who holds a position between being intellectually arrogant and intellectually gullible by accepting new ideas and beliefs in favour of supporting evidence, changing their mind to adapt to new knowledge, and thinking less of their intellectual strengths is called the intellectually humble having the virtue of intellectual humility. In times of situational crises like the pandemic, people with restricted beliefs are seen to change themselves from being intellectually arrogant to being intellectually gullible and start believing everything other people say or false information

about the situation and ways to combat it. However, studies show that intellectual humility can significantly check people's belief towards false information and conspiracy theories, which can contribute to consequential and even dangerous outcomes such as rejection of science (e.g., Fasce & Picó, 2019), ideological extremism (e.g., van Prooijen et al., 2015), biased decision-making (e.g., Brotherton & French, 2014; Bronstein et al., 2019; Lobato et al., 2014) and so on.

"A great man is always willing to be little" are the words of Ralph Waldo Emerson which encompass the idea of intellectual humility as a shared quality of great personalities worldwide. Whether scientists, political leaders, spiritual sages, or corporate tycoons, we all have limits to the way we think, but those who are aware of them are much better at anything. Intellectual humility is the acquired ability to be open to different points of view and to admit that one's own beliefs and opinions might be wrong. This is not something people are born with, but it is something they can certainly gift themselves. In other words, intellectual humility is knowing how much you don't know and being able to appreciate how smart other people are. It is also the foundation of critical thinking, which helps us become more consistent and tolerant instead of just open-minded. Intellectual courage and intellectual empathy, which are parts of intellectual humility, make people more likely to work together, so they learn important skills for being happy in a democratic society. In secular civilizations with many different cultures and religions, every future citizen needs to practice tolerance. Research shows that intellectual humility makes people more prosocial (Krumrei-Mancuso, 2017), open to different points of view

(Porter & Schumann, 2018), social (Bąk et al., 2022), religiously tolerant (Hook et al., 2017), forgiveness and empathic concern and a better person overall (*What Is Intellectual Humility?*, n.d.). The reason behind it may be attributed to the factors underlying intellectual humility as defined by Mancuso and Rouse, which are respect towards viewpoints of others, absence of intellectual overconfidence, separation of ego from intellect and willingness to revise own viewpoint. In other words, intellectual humility is "a non-threatening awareness of one's intellectual fallibility" (Krumrei-Mancuso & Rouse, 2016), a perception that one's knowledge and belief can be proven wrong at any point in time under specific circumstances. It helps people admit their fallibility of being wrong and gives endless opportunities to make it right and adapt to a growth mindset rather than clinging to a fixed mindset (Porter, 2015). Another view of intellectual humility asserts it as a metacognitive core comprised of recognizing one's limit of own knowledge and one's fallibility to address it (Porter et al., 2022). This essence is manifested in behaviours that show intellectual humility and an appreciation for the intelligence of others. The following diagram expresses the metacognitive construct of intellectual humility in a comprehensive manner –

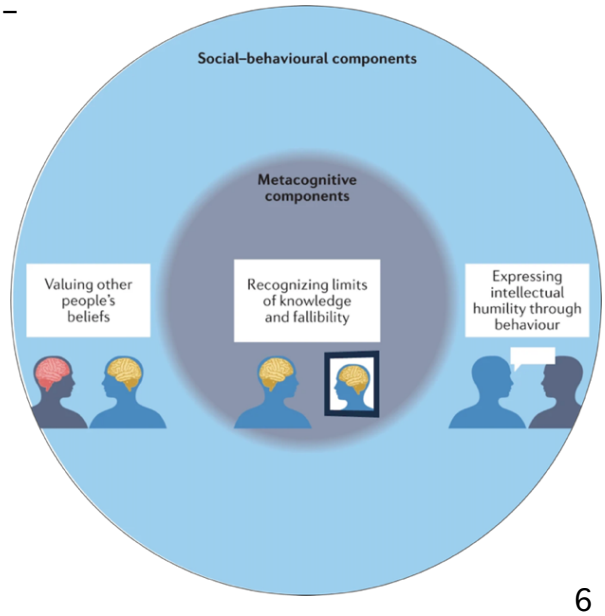

Figure 1.1
Conceptual representation of intellectual humility
(source: Porter et. al., 2022)

1.3 Roots and correlates of intellectual humility

Following Aristotelian ethics, a moral virtue like intellectual humility falls between two vices, i.e., intellectual arrogance and intellectual servility, the same as courage stands between cowardliness and recklessness. The concept of intellectual humility varies across theorists, and some call it a personality trait, intellectual tempers, and others call it a self-regulatory habit (*What Is Intellectual Humility?*, n.d.). Still, whatever it is named, the essence remains the same which is an intellectual virtue and a matter of metacognition (Krumrei-Mancuso et al., 2020). Earlier, it was only a concern in religious philosophies until psychologists showed some interest in how it develops and affects other domains of behaviour and learning. Porter et al., (2022) matrixed a few studies tracing the correlates of intellectual humility and found positive associations with psychological constructs like the need for closure (Mixed associations: Porter & Schumann, 2018), general humility (Alfano et al., 2017), openness to experience (Haggard et al., 2018), general humility (Krumrei-Mancuso & Rouse, 2016), need for cognition (Davis et al., 2016), epistemic curiosity (Krumrei-Mancuso et al., 2020), growth mindset (Porter et al., 2020) and negative associations with narcissism (Leary et al., 2017), dogmatism (Christen et al., 2019) and neuroticism (Brienza et al., 2018).

Table 1.1
Summary of correlates of intellectual humility

Constructs	Nature of Relationship	Clarity of evidence
Need for closure	Mixed	Unclear
Openness to experience	Positive	Clear
General humility	Positive	Clear
Epistemic curiosity	Positive	Clear

Growth mindset	Positive	Clear
Narcissism	Negative	Clear
Need for cognition	Positive	Clear
Dogmatism	Negative	Clear
Neuroticism	Negative	Clear

(Adopted from Porter et. al., 2022)

1.4 Importance of intellectual humility

People can't do rational calculations because their brains aren't powerful enough. Instead, they use shortcuts that are prone to mistakes, which we call "heuristics." One version of this perspective says that even when people could optimize, or figure out the best decision, they often use heuristics instead to save time at the cost of some accuracy. The first one assumes that we can't find the best solution, and the second one is a practical decision that it might not be worth our time. Both assumptions are based on the idea that accuracy and effort are trade-offs: the less information, computation, or time we use, the less accurate our judgments will be. Researchers think that this trade-off is one of the few general laws of the mind that leads to cognitive bias. It is a pattern of wrong thinking that happens when people try to understand and make sense of the world around them. It affects the decisions and judgments they make.

The human brain is robust, but it has its limits. Cognitive biases often happen because our brains try to make processing information easier. Biases are often like rules of thumb that help us understand the world and make decisions quickly. Confirmation bias, self-serving bias, and myside bias are among many that people commonly commit, which can directly be challenged

by virtue of intellectual humility. As found in these types of biases, people's inclination towards their own arguments, beliefs and knowledge are major factors which can be taken care of by acceptance of the idea of being wrong, incomplete and little. As biases lead to deceptive decisions followed by fatal consequences, we must embrace intellectual humility in people so that decisions are rightly taken or rightly proven to be existent. Samuelson & Church (2015) proposed that the human tendency to rely on heuristics and cognitive biases may lead to arrogant behaviours. The dual system of human cognition suggests that thinking and reasoning are characterized by two distinct systems - system 1 processes: which are fast, automatic, associative and intuitive, and system 2 processes: slow, conscious, deliberate and analytical (Kahneman & Frederick, 2002). In order to reason intelligently and avoid biased thinking, it is necessary to adopt system 2 which is deliberate, analytical, intuitive and associative. Therefore, in order to facilitate intellectual humility, system 2 must be engaged and promoted.

The idea that intellectual humility pushes peoples' limit of knowing, learning and accepting things is, more or less, centred around the essence of tolerance to different perspectives. With increasing globalization, we have become so engaged in ourselves, our goals and our ideas that we have forgotten our co-existence with people of different personal, social, emotional, moral, religious, and political beliefs. We think to have limited or no time for listening to others' views or taking their perspectives on tasks that we feel ownership of. Our everyday observations and experiences from the very morning can be instrumental in identifying our position in this regard. We

deliberately try to avoid conflicts and arguments with others as we think that it may lead to agitation and therefore disequilibrating our mental peace. But, over the course of time, by repeated avoidance of conflicting situations, we end up drawing a fence of comfort around us and we become reluctant to live beyond it. If every one of us does the same thing, assume how many circles of imaginary comfort would be drawn, which eventually would populate the space and therefore collide with each other ending up making noises and chaos. While a little tolerance within us can entirely stop this chaos from letting happen, with minimum or no loss of dignity and self-pride that we mask ourselves with.

1.5 Concept of openness

The words of Charles Kettering “People are very open-minded about new things...as long as they're exactly like the old ones!” denotes people's general fallibility in searching for new and unconventional alternatives to certain things or actions. This limits our opportunities to make life different (usually better; or worse, in some cases) than it would have been. Our inclination towards our own beliefs, goals or plans consistently pushes us not to take a chance or break to explore new choices, beliefs, and practices. It keeps us under a bubble of comfort zones, safe sides which, when crisis arises, breaks apart into fragments turning our lives vulnerable. On the other hand, being open-minded leaves us with choices, uncertainties and opportunities to cope with the catastrophes and challenges of life by undertaking unconventional means resulting in increased resilience. Open-mindedness is a corrective virtue that helps individuals to become flexible in cognitive affairs and, therefore, more

defiant to recommendations and manipulations. It has also been found to impact performance, exposure and prophecy in achieving long-term goals. Research shows that open-mindedness is a correlate of intellectual humility, broadly demonstrating people's adaptiveness to cognitive activities resulting in better decision-making. Therefore, intellectual humility and open-mindedness are intertwined in such a manner that is inseparable in explaining the concepts.

1.6 Intellectual humility and openness in education

A big part of the point of education is to teach students things so they can have informed conversations or do well on performances. But for education to be successful and for students to do well in the classroom and in life, it can be just as important to teach them how to be productive when they don't know something. Intellectual humility, which means knowing what you don't know and being willing to learn from others, has become one of the most important traits in the new social science of character (*Promoting Intellectual Humility in Classrooms*, n.d.). So, if intellectual humility makes people more open to different points of view, are there ways to get more of it? A lot of research suggests that the way people think about their own intelligence might be a good way to encourage intellectual humility. A "growth mindset" about intelligence is the belief that one's intelligence can change and grow. This helps develop many qualities that are thought to be linked to intellectual humility, such as more motivation to learn, less defensiveness, and a more accurate sense of one's knowledge and abilities (Ehrlinger et al., 2016). In contrast, a

fixed mindset about intelligence is the belief that intelligence, talent and other qualities are inherent and cannot be changed and there is limited or no opportunity to become good at something which an individual was not earlier. This way "fixed mindset" makes people more self-centered and defensive (Nussbaum & Dweck, 2008) in face of new situations. Therefore, it is evident that intellectual humility and openness promote a "growth mindset" which individuals in the education field, as well as in other fields, need to develop to deal with new situations and keep growth accelerated and sustained.

1.7 The rationale of this study

Over the last decade, the literature on intellectual humility emerged in philosophy and psychology seeking to define intellectual humility, develop measurement tools, and link intellectual humility to other personality traits such as openness as the world is witnessing a phenomenal change in almost all domains of life due to magnificent advancements in science and technology. Therefore, to remain open to the fact that unimaginable events are about to occur we should possess the virtues of openness and intellectual humility along with the limited resource and time that we have. The youths, who are in their preparatory years of life and also teachers, who are taking the responsibility in preparing them well are equally needed to embrace themselves with these essential qualities of 21st-century living i.e., openness and humility with special emphasis on intellectual humility as it facilitates the other forms of humility. In order to see whether students and teachers have those qualities or not, it is essential for examining the phenomena in the scientific context. The present

study justifies the search for existence and extent of intellectual humility and openness among people involved in and responsible for the growth of higher education.

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CHAPTER 2

PROBLEM OF THE STUDY

Chapter 2 Problem of the Study

This chapter describes the literature review, knowledge gap, major research questions, objectives, delimitations and hypotheses which have led the researcher to select and move forward with the problem of this research.

2.1 Literature review

For reviewing existing studies in this field, the researcher has first located theoretical and empirical studies on intellectual humility and openness and then narrowed down to the studies conducted in the area relating to education and higher education. For this purpose, the major research databases like ERIC, EBSCOhost, ProQuest, Psych Info, and Crossref were looked for. The researcher used *Publish or Perish version 8.6.4198* to narrow down the searches in the Crossref database which resulted in nearly one thousand journal articles published on intellectual humility. The researcher had chosen a total of 124 database entries from the last thirty years, mostly theoretical, in Crossref for selecting relevant research studies out of which he reviewed 42 relevant empirical studies on intellectual humility and 16 studies on openness to identify the knowledge gap for the present study.

2.1a On intellectual humility

Hopkin et al., (2014) compared the responses of intellectually humble individuals and those who are less so to the expression of religious ideas that either align with or conflict with the participants' own. Brief Multimodal Measure of Religiosity and

Spirituality (1999) and the Domain-specific Intellectual Humility Scale (2014) were used to analyse data from 202 American adults of varying religious beliefs. It was discovered that those with low intellectual humility in the religion area react more strongly than those with high intellectual humility to written opinions about religious beliefs, whether those ideas support or contradict their own. Further investigations revealed a moderately curvilinear relationship between the fervour of one's religious convictions and their intellectual modesty in the religious sphere, with less modesty following more fervent opinions both for and against religious ideas.

McElroy et al., (2014) conducted four studies to explore the role of intellectual humility in affecting adults' relationship with intellectual leaders. The first three studies (N_1=213, N_2=213, N_3=139) on community samples and undergraduate students in the United States focused on intellectual humility scale development. A total of 105 undergraduates participated in a fourth study (N4=105), which indicated that intellectual humility was associated with trust in the religious leader, forgiveness toward the religious leader, and a favourable outlook on the Sacred.

Hook et al., (2015) conducted two researches that look at how people's impressions of a religious leader's intellectual humility affect their reactions to the leader's wrongdoing. In the first study (N = 105), respondents judged the religious leader on several dimensions, including intellectual humility in regards to a variety of religious beliefs and ideals, as well as general humility and forgiveness of the leader for an offence. Even after accounting for participants' self-reported levels of general humility, those who reported feeling intellectually humble were more likely to report

being forgiving. Study 2 involved a completely new set of subjects (N = 299 this time), although it was designed to duplicate Study 1's results. As for the connection between intellectual humility and forgiveness, it was conditional on the nature of the transgression. The relationship between intellectual humility and forgiveness was larger for individuals who reported an offence in the area of religious ideas, values, or convictions than for participants who reported an offence in a different area.

Porter, (2015) in her doctoral research, conducted seven studies (N_1=178 community college students, N_2=187 adults, N_3=160 adults, N_4=82 adults, N_5=104 community college students, N_6=66 university students, N_7=88 high school students) intending to investigate the how intellectual humility affects disagreements and learning in college students and community peoples. Participants with higher levels of intellectual humility agreed that reading the justifications of others enlightened them. In Study 5, a process was employed to artificially instil either a growth or fixed mindset on intelligence. There was a striking difference between the participants in the growth mindset and the fixed mentality conditions in terms of intellectual humility and openness to the opposing position. Adaptive achievement drive centred on learning rather than showing off one's brilliance may be fostered by intellectual humility, according to the findings.

Zhang et al., (2015) looked at the connection between intellectual humility (IH) and how people react to religious strife. Undergraduate students (N=200) were asked to take out online surveys about their exposure to religious strife. In this study, participants scored (i) their own general humility, (ii) their impression of the

offender's IH toward the participants' religious beliefs and values, and (iii) their own individual IH toward the offender's religious beliefs and values. After detailing a religious quarrel, they went on to say that they had forgiven the wrongdoer. The victim's own IH and the offender's perceived IH were both positively related with forgiveness, even after accounting for the offender's general humility.

Davis et al., (2016) conducted two studies for distinguishing intellectual humility from general humility. As opposed to the more generalised humility, intellectual humility (IH) predicted more specific differences in the tendencies toward a need for knowledge, objectivism, and religious ethnocentrism (GH). Study 1 (N=1097) used confirmatory factor analysis to provide empirical evidence for this distinction. In the second study (N=355), researchers established more proof that IH and GH may be differentiated from one another. They concluded that intellectual humility (IH) is a subdomain of humility that involves having an accurate view of one's intellectual strengths and limitations.

Deffler et al., (2016) analysed data from a study involving 157 adults and discovered that those with more intellectual modesty were better able to recognise the difference between familiar and unfamiliar objects. this was true whether the objects in question aligned or conflicted with the participants' own values. The lack of a correlation between intellectual humility and response bias suggests that intellectually arrogant persons are not more likely to exaggerate their expertise.

Deffler et al., (2016b) looked at the connection between the ability to remember faces and names and intellectual humility, or the realisation that one's own opinions are subject to revision. The participants, mostly US community people, (N=157) were given the General Intellectual Humility Scale to fill out, as well as a test of their propensity to over-claim their expertise and an exercise testing their ability to recognise old and new things by accident. Analyses of signal detection performance revealed that people with more intellectual modesty were better able to recognise the difference between familiar and unfamiliar items, independent of whether or not those items were in line with the participants' existing beliefs. The lack of a correlation between intellectual humility and response bias suggests that those who are intellectually arrogant are not more likely to exaggerate their expertise. Altogether, the results lend credence to the idea that intellectual modesty is related to how well one does on memory tasks, suggesting that variations in intellectual modesty may be a reflection of differences in information processing and the ability to distinguish between known and unknown.

Hoyle et al., (2016) in their first study (N=804), constructed a measure of intellectual humility on specific viewpoints, beliefs, and opinions; in the second study (N=410), they standardised the scale. In their third study (N=156), they observed that intellectual humility toward a particular viewpoint is a multifaceted function of a person's dispositional intellectual humility, the extremeness of the viewpoint, and the rationale for the viewpoint.

Paine et al., (2016) surveyed graduate students in the helpful professions to examine two ideas on the connection between humility, differentiation-of-self (DoS), and intercultural competence. Seventy-five postgraduates from a Protestant-affiliated US university made up the sample. A positive correlation between humility and IC was discovered, and it was found that this correlation was mediated by DoS. A definition of intercultural competence as the capacity to negotiate interpersonal diversity was therefore confirmed by the findings. Training in intercultural competency within relationship and family therapy is discussed as a possible implication.

Hook et al., (2017) looked at the connection between (a) respect for religious views and values and (b) openness to other faiths. Conservativeness, religious commitment, intellectual humility toward religious ideas and values, and religious tolerance were all measured among self-identified Christian pastors (N = 196). Even after accounting for conservatism and religious fervour, intellectual humility remained a significant predictor of religious tolerance. Only those participants who also indicated high degrees of intellectual humility had a favourable correlation between exposure to religious diversity and religious tolerance.

Jarvinen & Paulus, (2017) studied whether understanding emotion, emotion regulation, and attachment are crucial to understanding intellectual humility. Divided into two studies on the adult American population, Study 1 (N=1204) found that participants demonstrated higher levels of cognitive flexibility in the face of challenges to one's (a)theistic beliefs than those exposed to ambivalent priming. Study 2 (N=1002) found that attachment anxiety, emotional valence, and the rated

intelligence of an interlocutor significantly predicted participants' openness to discuss ideas.

Krumrei-Mancuso, (2017) administered a study (N=314 adults in the United States) to determine if a lack of confidence in one's own expertise was associated with more altruistic character traits. Higher degrees of empathy, thankfulness, altruism, benevolence, and universalism, as well as lower levels of power-seeking, were all connected with intellectual humility, as predicted. The study has shown that there is a link between intellectual modesty and altruistic attitudes and that the two can be mediated by feelings of empathy and thankfulness. These results raise the intriguing prospect that intellectual humility may serve as a prerequisite for the associations between empathy, gratitude, and altruistic behaviour. The researcher concluded that intellectually humble people may be in a prime position to feel empathy and thankfulness, and thus a wide range of prosocial values, because they are aware of their own limitations, are not defensive about their opinions, and respect the beliefs of others.

Leary et al., (2017) conducted four studies examining intellectual humility—the degree to which people recognize that their beliefs might be wrong. Study 1 (N=300) found that intellectual humility was linked to traits including openness, curiosity, ambivalence tolerance, and low dogmatism when measured with a newly developed Intellectual Humility (IH) Scale. Participants with higher levels of intellectual humility in the second study (N=188) were less sure that their religious ideas were accurate and were less likely to judge others based on their religious beliefs. Studies 3 (N=205)

and 4 (N=396) demonstrated that those with higher levels of intellectual humility were more sensitive to the power of persuasive arguments than those with lower levels. This study not only deepens our comprehension of intellectual humility, but also substantiates the IH Scale as a reliable indicator of respondents' awareness of the limitations of their own worldview.

Haggard et al., (2018) in their four parallel research (N_1=386, N_2=296, N_3=322, N_4=612) with a total of 1616 adults from the United States, found that the Limitations-Owning Intellectual Humility Scale predicts openness, assertiveness, and genuine pride more than education, social desirability, and other measures of intellectual humility. The fourth study showed that admitting one's intellectual shortcomings was inversely connected to dogmatism, conservatism, and egotism.

Krumrei-Mancuso, (2018) showed that the highest levels of intellectual humility occurred among people with low and high levels of religiosity/spirituality and that there were minor, negative correlations between intellectual humility and a range of religious/spiritual characteristics. Several characteristics related to religion and spirituality predicted reduced intellectual modesty three years later in longitudinal analyses (N=100). The majority of the associations between religious/spiritual beliefs and lack of intellectual humility can be traced back to a right-wing authoritarian worldview, suggesting that it is not religious/spiritual beliefs per se that are linked to declines in intellectual humility, but rather socio-political attitudes about authority. After controlling for right-wing authoritarianism, a weak negative correlation was still present between religious affiliation and a lack of pride in one's own intelligence.

Krumrei-Mancuso, (2018b) used self-reported and other-reported data to conduct a longitudinal pilot study examining potential predictors and consequences of servant leadership among beginning leaders. Twenty-nine student leaders in the Residence Life programme at a Christian institution were evaluated twice: first before they started their jobs and again six weeks in. Over time, those who met the challenges of early leadership with more interpersonal and intellectual humility also demonstrated more servant leadership and associated traits. Six weeks after taking on a leadership role, more servant leadership, empathetic care, perspective taking, and compassion toward subordinates were predicted by differences in leaders' levels of humility throughout the transition. As such, these results provide preliminary empirical evidence in favour of the extensive theoretical underpinnings about the function of humility in servant leadership. Furthermore, differences in the relative importance of one's religious beliefs before and after assuming a leadership role were predictive of greater levels of self-effacement, servant leadership, and generosity toward subordinates. Given the already high levels of religiosity present in the group, this is quite striking. This suggests that religious integration by leaders is a more accurate predictor of leader outcomes than religious identification or initial levels of religiosity.

Porter & Schumann, (2018) studied understanding the limitations of one's own knowledge and appreciating the intellectual capabilities of others as one aspect of intellectual humility using four interrelated studies. The participants in Study 1(N=181 community college students) and 2 (N=188 American adults) who exhibited the most intellectual humility were also the most receptive to new information during the fictitious debates. The third study (N=169 American adults) found that people who

were more intellectually humble were more likely to be exposed to a variety of political viewpoints. Exemplifying a growth perspective toward intelligence was found to increase intellectual humility and tolerance of dissenting viewpoints in Study 4 (N=104 community college students). A growth attitude of intelligence was found to have fostered intellectual humility, which is correlated with openness during disputes.

Reis et al., (2018) in their four experimental studies and a diary study, looked at how a partner's responsiveness or lack thereof affected two indicators of intellectual modesty—reduced self-serving bias and greater receptivity to novel knowledge that may contradict existing ideas. People's tendency to rate themselves as better than an average peer, overclaiming personal responsibility for shared household activities, and hindsight bias were all found to be strengthened when people were led to perceive their partners as unresponsive and weakened when they were led to perceive their partners as responsive. Study 4, a diary study, indicated that participants were more willing to examine alternative, possibly contradictory points of view when they perceived their social environment to be receptive to them, and found similar effects of everyday perceptions of responsiveness on hindsight bias. The fifth study concluded that participants were more open-minded once they viewed their spouse to be receptive. When taken as a whole, these findings suggest that one aspect that dampens openness and bolsters non-defensiveness is the sense of the other person's responsiveness (or lack thereof).

Weidman et al., (2018) conducted five studies with a total of 1479 college and university students, including (i) a cluster analysis and categorization of words related

to humility generated by both lay-people and academic experts, (ii) exploratory and confirmatory factor analyses of momentary and dispositional experiences of humility, and (iii) experimental induction of a momentary experience of humility. These researchers have uncovered consistent evidence that humility comes in two flavours: grateful humility and self-abasing humility. In addition to being positively correlated with traits like genuine pride, guilt, and prestige-based status, appreciative humility is also evoked by personal accomplishment and manifests in action patterns focused toward applauding others. Dispositions like shame, poor self-esteem, and submissiveness are related with the self-abasing humility that is aroused by personal failure and entails negative self-judgments and action tendencies focused toward concealing from the evaluations of others.

Zachry et al., (2018) conducted a study to examine the manifestation of intellectual humility in the daily life of Americans through two subsequent studies. Both study 1 (N=612) and study 2 (N=445) adopted a 11-items State-Trait Intellectual Humility Scale (α = .91) and assessed IH in a 21-day experience sampling design. Result showed high correlations between state measure and trait measure of IH. It was also found that manifestation of IH was positively predicted by morality and negatively predicted by disagreeableness of the participants.

Zhang et al., (2018) explored the mediating effects of intellectual humility regarding one's religious beliefs on the effects of ideological variety on one's sense of belonging and meaning in a religious community. Participants (N=113) were asked to imagine themselves as part of either a religiously homogeneous or ideologically heterogeneous

small group, and then score their own sense of intellectual humility, sense of belonging, and expectations for what they may gain from the group. Intellectual humility attenuated the negative association between being in an ideologically diverse small group and feelings of belonging and meaning, such that the association was weaker at higher degrees of intellectual humility. Therefore, intellectual modesty protected individuals' feeling of meaning and belonging when interacting with those who had different ideological beliefs.

Danovitch et al., (2019) studied on 127 children between 6 and 8 years which looked at how intellectual humility (IH) changes through time and between individuals. IH was conceptualised as kids' estimates of their own scientific understanding and openness to sending off questions to adults for clarification. A variety of neurophysiological measurements were taken to index both early (error-related negativity [ERN]) and late (error positivity [Pe]) error-monitoring processes associated to cognitive control in children. Children's confidence in their own answers to questions was connected with the amount of responsibility they were given answering the questions, and older children displayed higher levels of IH than younger children. Higher IH was linked to IQ, but not social cognition or a drive for achievement. ERN was concerned with introspective evaluation, while Pe was concerned with the delegation of inquiry. They concluded that children's IH could be broken down into two distinct parts: epistemic and social.

Hodge et al. (2019) did two related studies with undergraduate students to look at the differences between religious intellectual humility and spiritual humility. Study 1

(N=244) found that religious intellectual humility predicted being open to religious differences and questioning religious beliefs. In the second study (N=202), they found that religious intellectual humility was a good predictor of moral foundations that were relevant to liberal political beliefs, and spiritual humility was a good predictor of moral foundations that were relevant to conservative political beliefs.

John Marriott et al., (2019) centred their research on the connections between intellectual modesty, openness to ambiguity, and a lack of rigid attachment, which are sometimes cited as justifications for lack of faith. More than a hundred atheist, secular, and freethought groups worldwide participated in the survey, which was distributed online. Specifically, it was discovered that intellectual grounds for non-belief were inversely associated to tolerance of ambiguity, while emotional reasons for non-belief were positively connected to nervous attachment. Neither the researchers' hypothesised connection between intellectual reasons for belief and intellectual humility nor their predicted connection between uncertainty reasons and tolerance of ambiguity, intellectual humility, and avoidant attachment was supported by the data. They also discovered that a lack of intellectual modesty was associated to the presence of early socialization causes for non-belief.

Zmigrod et al., (2019) studied 108 participants, looking into how intellectual modesty links to other aspects of one's mind. Cognitive flexibility, as judged by objective behavioural measures, was found to be a predictor of intellectual modesty. Intellectual modesty was also a predictor of high IQ. The connections were especially strong for the intellectual humility traits of considering others' perspectives with due regard and

being willing to change one's mind in light of new information. The findings showed a reciprocal relationship between intelligence and cognitive flexibility, with the former being advantageous for intellectual modesty when intelligence was low and the latter being so when intelligence was high. Individuals who scored well on both intelligence and adaptability did not show more intellectual modesty than those who scored highly on either intelligence or adaptability alone, indicating a compensatory effect. These results imply that there are two distinct psychological routes to intellectual humility. Having high levels of either cognitive flexibility or intelligence is sufficient, but having both is preferable.

Alshehri, (2020) revealed that there is a direct association between intellectual humility and academic accomplishment in a study conducted on secondary school teachers (N=290) in Jeddah schools in Saudi Arabia.

Cannon et al., (2020) examined the relationship between the Dark Triad traits and academic achievement (N = 924) by contrasting students' levels of arrogance, conceit, and neuroticism at public and private schools in the United Kingdom. Students who attended private schools scored higher on the Dark Triad traits than their public school counterparts. Students who attended private schools also performed worse academically and showed less intellectual humility than their public school counterparts. For those who attended private schools, the Dark Triad qualities had a larger negative correlation with intellectual modesty. In addition, the Dark Triad characteristics mediated the association between educational attainment and

intellectual modesty, as well as the connection between gender and intellectual humility.

Krumrei-Mancuso & Newman, (2020) in their study of 587 individuals from the United States, looked at how participants' levels of "socio-political intellectual humility," or SIH, affected their perspectives on various political organisations and problems. Separate from political apathy and indifference, and unconnected to trusting in unsubstantiated political statements, SIH was identified. Positive psychological health was linked to less ideological and religious divisiveness. Individuals who were primed to think from a defensive rather than an accuracy-motivated stance were likewise found to be more attentive to information on the topic of immigration when SIH was present. Finally, higher trait levels of SIH were related to greater receptivity to information on the topic of immigration among those who had been prepared to consider the limitations of their own expertise with regard to this group of people.

Krumrei-Mancuso et al., (2020) explored the effect of intellectual humility (IH) on learning investigated through five research (N=1189). IH was linked to a slightly lower GPA and a correlation with general knowledge, but it had no bearing on IQ. Also, when it came to thinking about thinking, the results were contradictory. More IH was linked to a more realistic assessment of one's own knowledge and less with boasting about what one doesn't know. Negative self-assessment of one's own cognitive abilities was also linked to IH. Multiple measurements of IH, each probing different facets of the construct, may account for the discrepancies. Finally, IH was linked to a number of traits that facilitate learning and development, such as introspection, the will to learn,

intellectual interest, inquisitiveness, and an open mind. As a corollary, IH was linked to a decrease in social vigilantism, which could facilitate group study. In conclusion, IH was linked to a great curiosity towards learning.

Onody et al., (2020) examined the possibility that low self-esteem is linked to a lack of willingness to forgive oneself, to defensiveness, and to a lack of self-compassion. Trait humility was found to be directly and indirectly connected with higher levels of trait self-forgiveness in Study 1 (N = 302). Study 2 (N = 194) indicated that both trait and state humility were positively linked with willingness to reconcile, and that higher levels of self-forgiveness were connected with both directly and indirectly through reduced defensiveness. It was seen that humble people were less likely to feel guilty about their mistakes, which had a beneficial impact on their openness to making amends. While humility has been largely overlooked in the past, the current research suggested that it may play a number of crucial functions in the forgiveness process.

Stanley et al., (2020) studied the effects of intellectual humility on individuals' perceptions of the intelligence and moral character of their socio-political opponents and their openness to forming alliances with those persons. Four preliminary investigations (N=1,926) have quantified intellectual modesty, moral and intellectual denigration of opponents, and openness to ally with those with opposing views. In two further research (N=568), participants were shown social media posts from an ideological opponent on a contentious social or political issue and then asked to comment on those posts. Finally, they assessed how inclined participants were to

befriend the opponent, "friend" the opponent on social media, and follow the opponent on social media, as well as participants' intellectual humility, intellectual derogation, and moral decency. It was discovered that people with poor intellectual humility were more likely to make derogatory comments about their opponents' intelligence and moral integrity, as well as less inclined to befriend or follow their opponents on social media.

Bak & Kutnik, (2021) found that self-esteem and narcissism are positive and negative predictors of intellectual humility, respectively. Self-esteem and narcissistic inventory measures were administered to 165 Polish adults aged 20 to 50. Findings indicated that regression models performed best in areas where subjects were required to indulge their own sense of self-importance.

Bowes et al., (2021) worked on reducing political "myside" bias by comparing two community samples (N_1 = 498; N_2 = 477) to test the hypothesis that intellectual humility is correlated with decreased bias. Consistent with the study's hypothesised inverse relationship between intellectual humility (IH) and political partisanship, measures of IH were shown to be statistically significant across a wide range of theoretical frameworks, theoretical domains, and empirical populations. These associations persisted even after accounting for modesty. They also looked at the relationship between IH and political myside bias and found that it was the same for people on the left and the right. This research established IH as one of the few psychological traits known to predict less political myside bias, albeit with substantial limitations and cautions.

Hodge et al., (2021) conducted two studies looking at what factors lead to political modesty (Study 1) and how that trait might affect openness to other points of view (Study 2). Political modesty was correlated favourably with frankness but unfavourably with political zeal in Study 1 (N=311). In Study 2 (N=194), when participants' political commitment was accounted for, those with higher levels of political humility were more likely to find merit in the opposing viewpoint, to view the findings of a politically neutral essay as inconclusive, and to give a higher rating to a political essay that was opposed to their own. They concluded that political modesty was inversely associated with avoidance of new experiences.

Krumrei-Mancuso & Newman, (2021) Self-reported socio-political intellectual humility (SIH) was studied among a representative sample of Americans (N = 852). Even after accounting for political leaning and other relevant factors, those with SIH were found to be less likely to dislike or avoid political discussion, to have higher levels of political tolerance, to have lower levels of social dominance orientation, and to have greater values and behavioural intentions focused on social equality. Positive and fewer negative evaluations of someone's political ideas were similarly linked to SIH. Also, SIH tempered the degree to which one's agreement with a political statement at the outset was replaced by disagreement after hearing the opposing viewpoint.

Meagher et al., (2021) investigated the behavioural links between self- and peer-rated intellectual humility. After months of working together in class, participants in Study 1 (N=108 aspiring nurses) completed peer evaluations. Both openness and agreeableness were linked to self-reported intellectual modesty, but agreeableness

was mainly linked to peer evaluations. Participants in Study 2 (N=162 from a community sample representing a variety of racial and ethnic backgrounds) were split into small groups for 30-minute discussions on a divisive social or political issue. Although intellectual modesty was linked to high levels of participation in these recorded exchanges, it was found that intellectual humility, as seen by one's peer was characterised by low negativity and positive, supporting statements. In the end, the researchers discovered that self and peer judgments utilise the social and epistemic elements of intellectual humility differently.

Huynh et al., (2022) checked the correlation between intellectual humility and test anxiety. College students (N=181) in Study 1 filled out a measure of intellectual humility (CIHS, 2016) that consisted of four subscales, as well as two measures of test anxiety. A community sample (N=196) selected from the active online labour market also took the surveys in Study 2. Higher levels of intellectual humility were associated with lower levels of test anxiety, as was demonstrated in both investigations. In particular, the Sarason Test Anxiety Scale and intellectual modesty were found to have a negative connection in Study 1, and this finding was replicated in Study 2 for the Westside Anxiety Scale as well. Furthermore, the study discovered that the Independence of Intellect and Ego subscale measuring intellectual humility was the primary mediator of this association. These findings persisted, surprisingly, even after accounting for a variety of relevant demographic variables.

Koetke et al., (2022) contributed research on how people respond to political disinformation by engaging in fact-checking and other investigative behaviours online.

Study 1 (N=289) found that investigative behaviours increased accuracy in discerning political misinformation; Study 2 (N=285) found that intellectual humility reliably predicted investigative behaviours in this context; and Study 3 (N=315) used an innovative fallibility salience modification to examine its effect on inducing intellectual modesty.

Koetke et al., (2022) in three interrelated studies (N=1232), considered the advocacy during the COVID-19 pandemic, while health professionals attempt to disseminate potentially life-saving information, they are hampered by misinformation and bogus news about the virus. They tried to explore whether there was anything people could do to counter the false information they've heard about COVID-19, and what drove them to take action in this regard? It was also hypothesised that people can participate in investigative behaviours (such as fact-checking and seeking alternate perspectives) to evaluate the veracity of the material they encounter. They looked into intellectual humility as a potential predictor of these crucial actions. Results indicated that persons with higher levels of intellectual humility were more likely to engage in exploratory behaviours in response to COVID-19 disinformation. This was true for both planned and actual behaviour.

Paine et al., (2022) examined the extent to which intellectual humility predicted mature alterity outcomes among a sample (N=210) of Christian seminary students in the United States, controlled for the impact of five moral foundations (care, fairness, loyalty, authority, purity). According to the results, ethical considerations did not explain a sizable fraction of the diversity in participants' dedication to intercultural

competency. After controlling for other moral principles, the Fairness/Reciprocity factor was still found to predict commitment to intercultural competency. Over and above the impacts of moral foundations, intellectual humility predicted many mature alterity outcomes, and there was a negative direct link between the Purity/Sanctity foundation and tolerance of non-Christians.

Wang et al., (2022) look at the correlation between humility in leadership and professional advancement. The study's authors expected that subordinate teams' voice networks would place humble leaders in the centre, where they could boost their own performance and receive positive recommendations for rewards. Multiple sources, including a field study with 116 managers, 461 employees, and 34 shop managers from a Chinese company, as well as an experiment using vignettes with 233 working adults, provided strong support for these hypotheses.

2.1b On openness or open-mindedness

Barrick & Mount (1991) conducted a meta-analysis of studies on the relationship between openness to experience and other four personality traits with job performance indicators among 23,994 different professionals covered in 117 studies between 1952 and 1988. Openness to experience was found to have strongly predicted the training proficiency of the individuals and indicated to have a positive attitude towards learning experiences during the training programmes and in general. Among other conclusions, this meta-analysis claimed that openness or openness to experience is synonymous with the ability to learn and learning motivation.

Pascarella et al., (1996) in a four-year longitudinal study, investigated 3331 freshman students from 18 colleges across 15 states in the USA on their openness to diversity and challenge with respect to multiple social, academic and performance-related indicators. Controlling for students' demographics, they discovered that being in a non-discriminatory racial environment, living on campus, attending a racial or cultural awareness workshop, and having extensive social interactions with peers from different backgrounds all positively influenced their openness toward diversity and new experiences.

Summers et al., (2002) conducted a study on 3900 students of the University of Texas at Austin using the modified Social Connectedness scale by Lee & Robbins (1995) and Openness to diversity and challenge scale by Pascarella et al., (1996) measured their openness to diversity and campus connectedness. They found that with progress in college years i.e., from freshman to sophomore, students have developed more openness to diversity which has resulted in more campus connectedness. Variations in openness were detected in terms of students' personal and demographic characteristics.

Bozionelos (2004) studied 279 regular employees of 3 universities in north-west England to see an association between openness along with other four personality traits and work involvement. Openness was measured with the UK edition of the Cattell 16PF5 and work involvement was measured using a four-item scale developed by Lodahl and Kejner (1965) and obtaining data on hours worked in a week. Results found that individuals with high extraversion and high openness were more inclined to

work as reflected in their working hours. It was concluded that tendencies relating to openness infuse motivation to learn, perform activities and stay involved in learning.

Nguyen et al. (2005) studied 368 undergraduate and graduate students at a Southern university in the USA to see if personality traits predicted students' academic performance. Big Five inventory was used to assess personality traits and GPA was considered as an indicator of academic performance. It was found that openness (the researcher viewed it as intellect) was able to significantly predict grades in individual courses but could not reach the level of statistical significance in predicting overall GPA. They also found gender as having a moderating role in the relationship between openness and academic performance.

Niehoff (2006) examined the association between traits of personality and intension of mentoring among 194 medical professionals of Midwestern state veterinary medical association in the USA. They found a strong positive correlation between participation as a mentor and openness to experience and no association with agreeableness. Further, they found only openness to experience among other personality traits to have shown significant beta coefficient in hierarchical regression model. Conscientiousness, extroversion, and openness were all linked to participation in the social, task, and concept domains of their study.

Ziegler et al. (2012) explored the relationship between openness, fluid intelligence and crystallized intelligence in 180 undergraduate students in Germany. They found an effect of openness and fluid intelligence on crystallized intelligence when other

explanatory variables are controlled. An interaction effect between openness and fluid intelligence and longitudinal data suggested that openness helped students develop fluid intelligence which, six years later, influenced the development of crystallized intelligence in the same participants.

Basak & Ghosh, (2014) studied one hundred sixty school teachers in Kolkata, to investigate the correlation between personality traits and professional development. The researchers used the NEO five-component questionnaire (Costa & McCrae, 1992) and the Career Stage Scale (McCormick & Barnett, 2008). The results showed a positive and significant relationship between openness to change, agreeableness, and conscientiousness and all career stages, a negative and significant relationship between neuroticism and the stocktaking and disengagement stages, and a positive and significant relationship between extraversion and the stabilisation and disengagement stages. Using a multi-step regression model, they found that several personality characteristics were strong predictors across the whole working life cycle. Educators at all levels of their careers were found to be more positively defined by openness to change, agreeableness, and conscientiousness, and less negatively characterised by neuroticism, than the general population.

van Tilburg et al. (2015) conducted four subsequent and related studies on undergraduate students ($N_{1,2}$=175 undergraduate students, N_3=62 psychology undergraduate students, N_4=106 random adults) at the University of Limerick and found openness to experience mediated the positive effect that nostalgia has on

creativity. It was also found that nostalgia boosted creativity mediated by openness among randomly assigned adults in the fourth study.

J. Zhang & Ziegler (2015) explored fluid intelligence and five-factor personality traits as predictors of academic achievements in Math, Chinese and English as subjects in 836 students studying at secondary schools in China. Results showed openness had a positive impact on all the subjects having other variables controlled. Hierarchical latent regression found a strong interaction effect between openness and figural reasoning.

Hascher & Hagenauer (2016) studied openness to theory, self-efficacy, emotions, and classroom behaviour in relation to one another during student teachers' field experiences. They hypothesized that, future educators who are more receptive to (pedagogical) theories will have a greater chance of developing a healthy sense of self-efficacy, which will in turn elicit feelings of confidence and pride, bolstering their autonomy support for student learning. 117 secondary education majors-in-training at an Austrian university participated in the study. In contrast to the expected relationship between openness to theory, self-efficacy, and emotions, a direct relationship between autonomy support and their survey responses was not discovered.

Shi et al. (2016) explored the connections between openness to experience, cognitive flexibility, and original thought. The authors of this study examined the association between intelligence and creative thinking among a group of 831 Chinese elementary

schoolchildren. The results demonstrated strong positive correlations between receptivity to new information, cognitive ability, and original thought. This research's central finding was that receptivity to new information mediated the connection between high IQ and original thought. However, the moderate effect existed only in urban contexts, and the association between openness to experience and creative thinking was larger for urban than for rural youth.

Otten (2017) looked at the attributes of Honesty-Humility and Openness to Experience to determine their relevance to a student's confidence. The HEXACO-SPI was used to evaluate the character traits of a sample of 151 freshmen (ages 11-14) in high school. After that, they were tasked with completing four different digital simulation-based hypothesis generation projects relevant to the field of science education. Their level of Hypothesis Confidence might be recorded for each project. The correctness of the hypotheses was evaluated to flag instances of (over)confidence. The results showed that boys are more prone to both Hypothesis Confidence and Overconfidence than girls. There was a large amount of variance in Hypothesis Confidence that could be explained by a regression model including Gender, Age, Accuracy, Honesty-Humility, and Openness to Experience. The more incremental variance was explained by Openness to Experience and Honesty-Humility than by accuracy, gender, or age. In the end, it was determined that one's level of confidence in a given set of hypotheses does indeed depend on one's own character traits.

Johnson et al., (2017) investigated the factors that influence educators' willingness to adopt novel methods in the classroom. Using data from 2,133 educators of 51 different high schools, the direct and indirect relationships between organisational climate (i.e., principal support and teacher affiliation) and teachers' openness were analysed through structural equation modelling (i.e., efficacy and burnout). Openness was found to have positively correlated with teachers' ratings of their own efficacy and with their sense of teacher affiliation and principal support but was not significantly linked to exhaustion. Post hoc analyses revealed that only principle support was associated with higher teacher efficacy and, in turn, greater teacher openness, among teachers with high levels of burnout.

Panda & Santosh (2017) surveyed teachers at India's Indira Gandhi National Open University (IGNOU) to learn their thoughts on openness and how they feel about sharing classroom materials. The researchers at IGNOU polled their faculty and instructors (N=69) with a pre-designed survey. The findings demonstrated that the faculty members assigned a high value to resource sharing within academic institutions and make learning resources available at no cost; that an institutional policy on open educational resources is necessary, and that training on intellectual property rights, copyright, and the development and use of OER is desperately needed.

Kim et al., (2019) did a meta-analysis of 25 studies comprising 6294 teachers around the world concerning the association between personality traits of teachers including openness and teacher effectiveness and burnout along in terms of a few moderators

like teaching effectiveness measures, and level of education. Openness was found to have positive correlation with teaching evaluations and other aspects of teaching effectiveness. Results of both self-reported measures and other-reported measures found that personality traits i.e., extraversion, and conscientiousness had a negative correlation with teacher burnout.

2.2 Knowledge gap

From general humility, with heavy emphasis on philosophical dogma, comes the concept of intellectual humility or intellectual modesty. Since intellectual modesty was found its identity in academic studies, the vast majority of articles and papers published worldwide have taken a theoretical approach, engaging in critical discourse about connections to related or related-to-but-different fields of study and modes of thought. Starting in the last decade, researchers have sought to identify the factors contributing to intellectual humility and how that trait affects several spheres of existence, such as religion, ethics, relationships, psychology, and politics. Some research has centred on the effectiveness of group-based therapies for fostering intellectual humility among participants of varying ages. Researchers have looked at both young and older adults to determine the correlation between intellectual humility and success in school. Many academics have also identified a substantial correlation between intellectual humility and open-mindedness, which is particularly important given the rapid pace at which our perspectives and societal roles are shifting. Apparently, openness or open-mindedness was studied by many researchers and found to have influenced the diversity-acceptance of students, their challenging attitudes, academic performance, and intelligence. Studies on adult samples,

especially on teachers and professionals revealed that openness was more likely to be associated with professionalism, work involvement, and readiness for mentoring, as well as less likely to be associated with burnout and pessimism. For improved performance, cooperation, advancement, and sustainability, those involved in educational activities, especially at the higher education level, need to embrace both attributes, namely, intellectual humility and openness. Therefore, it is crucial at this moment to understand and evaluate intellectual humility, openness, and their interplay among a sizable population. However, there appears to be very little research on the topic of assessing these two attributes combined in the education sector. As a result, it is concluded that researchers in this field have yet to address the gap in the existing body of knowledge regarding the mapping of intellectual humility and openness among students, teachers, administrators, and other individuals involved in education or, more specifically, higher education. The researcher further identified that no studies had been conducted in the field of intellectual humility and openness in India, especially in West Bengal, which used to be a reservoir of intellectual minds who led India's major academic expeditions in relation to higher education.

2.3 Research questions

In view of the above-identified knowledge gap, the present researcher has asked the following research questions which shall guide the academic exploration of this research –

a. How intellectually humble and open are the stakeholders of higher education?

b. How do personal, social, academic and behavioural differences result in variation in intellectual humility and openness?
c. Does intellectual humility predict openness in stakeholders of higher education?

In addressing the research questions, the problem of the study is selected and specified as

"Intellectual Humility and Openness in Higher Education"

2.4 Delimitations

Due to time and resource constraints, the present study was delimited to the following –

a) The study was to be conducted only in West Bengal.
b) Only students and teachers in higher education were to be considered as stakeholders.
c) Very few personal, social and demographic characteristics of the participants were to be considered, along with their basic academic details.
d) Only three daily activities namely reading preference, frequency of newspaper reading and social media engagement of the participants were to be considered as behavioural characteristics.
e) Intellectual humility and openness were to be measured using self-reported questionnaires, instead of observations and interventions.
f) The relationship between intellectual humility and openness was to be checked in simple terms.

g) A few more than one thousand participants were to be included in this study.

2.5 Objectives

In view of the research questions and delimitations of the study, the objectives were formulated -

a) To assess intellectual humility (IH) and openness (OP) in higher education students.
b) To check for variations in IH and OP with different personal, social, demographic, academic and behavioural characteristics of higher education students.
c) To assess intellectual humility and openness in higher education teachers.
d) To check for variations in IH and OP with different social, demographic, academic and behavioural characteristics of higher education teachers.
e) To compare students and teachers in terms of IH and OP.
f) To find out the relationship between intellectual humility and openness in students, teachers, and the whole.
g) To check if age influences the relationship between IH and OP.

2.6 Hypotheses

The following null hypotheses were formulated based on objectives of the study -

$H_0$1: Intellectual humility and openness do not significantly vary with participants' gender.

$H_0$2: Intellectual humility and openness do not significantly vary with students' birth order.

$H_0$3: Intellectual humility and openness do not significantly vary with participants' locality of residence.

$H_0$4: Intellectual humility and openness do not significantly vary with participants' family structure.

$H_0$5: Intellectual humility and openness do not significantly vary with participants' marital status.

$H_0$6: Intellectual humility and openness do not significantly vary with participants' nature of the institute.

$H_0$7: Intellectual humility and openness do not significantly vary with participants' faculty.

$H_0$8: Intellectual humility and openness do not significantly vary with students' course level.

$H_0$9: Intellectual humility and openness do not significantly vary with teachers' academic designation.

$H_0$10: Intellectual humility and openness do not significantly vary with teachers' teaching experience.

$H_0$11: Intellectual humility and openness do not significantly vary with teachers' highest educational qualifications.

$H_0$12: Intellectual humility and openness do not significantly vary with participants' reading preferences.

$H_0$13: Intellectual humility and openness do not significantly vary with participants' habit of newspaper reading.

$H_0$14: Intellectual humility and openness do not significantly vary with participants' social media engagement.

$H_0$15: Participants' age does not significantly correlate with their intellectual humility and openness.

$H_0$16: Intellectual humility and openness do not significantly differ between students and teachers.

$H_0$17: Participants' Intellectual humility does not predict their openness.

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CHAPTER 3

METHODS AND MATERIALS

Chapter 3 Methods and Materials

This chapter describes the method and procedures followed in the study. The researcher has adopted various techniques to structure the work by complying with different theoretical assumptions in educational research. Following sections have presented the details of steps, decisions and activities performed in the study.

3.1 Method and study design

For obtaining a comprehensive data oriented findings, the present research has primarily followed quantitative approach along with qualitative explanations. The researcher has conducted two studies – one on higher education students and the other on higher education teachers. Both the studies were descriptive in nature, have similarities and was conducted based on the purpose and objective of the study i.e., to assess intellectual humility and openness among students and teachers in higher education and find variations with different observed indicators. Cross-sectional survey design was used to collect data from various parts of the geographical location which the present study covered.

3.2 Population and sample

Both the studies in this research has focused only on higher education sector of West Bengal, a state located in eastern region of India. The population of the first study (study 1) consists of all the students studying at colleges and universities of this state. According to AISHE Report 2019-20, there were 21,60,893 students including

10,69,629 male and 10,91,264 females studying at different levels of higher education in West Bengal (UGC, 2021; AISHE 2019-20). The population of the second study (study 2) considers all the teachers of all the higher education institutions including 42 universities, 58 govt. colleges, 450 govt. aided colleges and 8 govt. engineering institutions (*Banglar Uchchashiksha*, n.d.) as its population. A total of 65,546 teachers including 42,780 male 22,766 female teachers were working in the institutions mentioned above (UGC, 2021; AISHE 2019-20).

The required sample size for 21,60,893 students at 95% confidence level, 0.05 margin of error and 0.25 population variance is 385. Study 1 covered 880 students from 15 universities and 21 colleges spread across 15 districts of West Bengal which is twofold higher than the required sample size as per the sample criteria. But for 65,546 teachers, following the same parameters, the required sample size is 382 which study 2 could not cover. It covered only 200 teachers from 22 universities and 100 colleges spread across 21 out of 23 districts of West Bengal. Although, study 2 could not meet the required sample size but it covered a wide geographical region of West Bengal. The researcher surveyed a list-based sampling frame (Fricker, 2017) selected on basis of the available email databases of students and teachers that the researcher could gather from the population.

Figure 3.1a
The geographical location of the population and sample

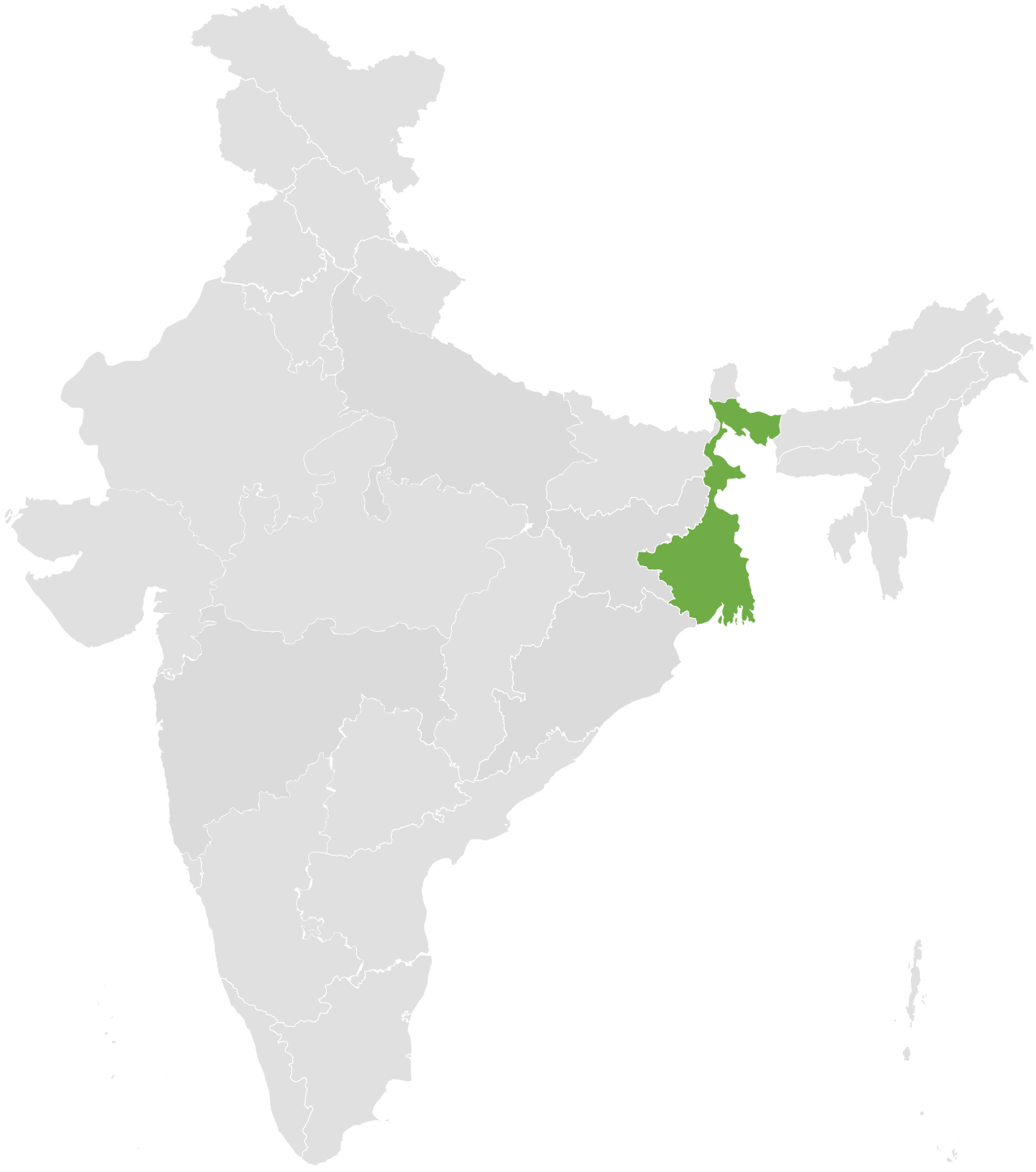
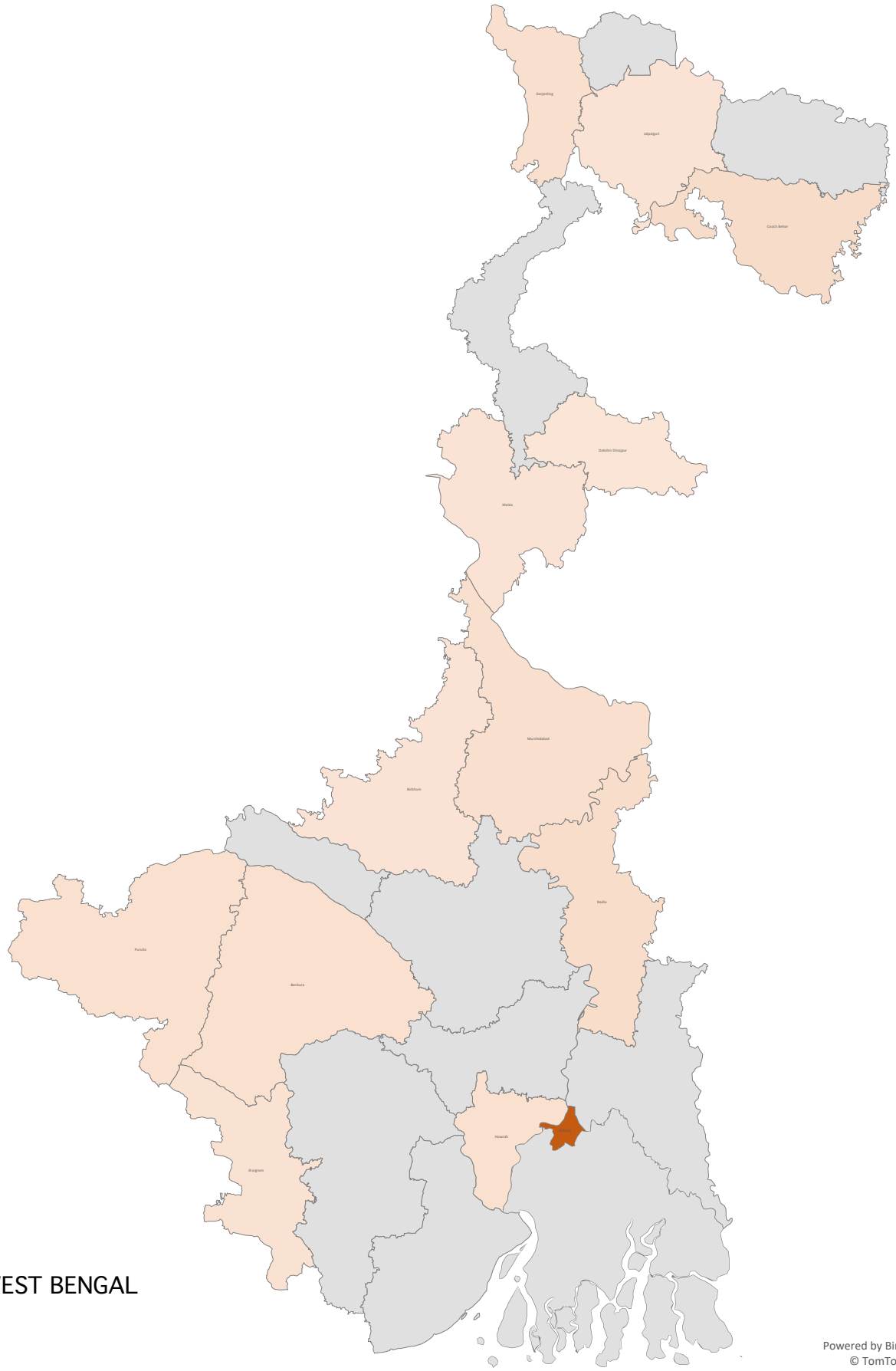


Figure 3.1b
The coverage area of the study



WEST BENGAL

3.3 Variables

The variables in this research were considered based on some theoretical assumptions on intellectual humility and openness as well as influenced by recent research conducted in these fields. Both studies 1 and 2 have considered a few classificatory indicators of the participants and categorized these into three groups namely, socio-demographic, academic and behavioural. These classificatory indicators were considered explanatory variables in the studies as the researcher assumed these indicators to have an effect in the variation of intellectual humility and openness. Although both studies have commonly considered three categories of explanatory variables, there are some differences. Study 1 has considered gender, age, birth order, locality of residence, family structure and marital status as socio-demographic variables; nature of institute, faculty and course level as academic variables; and reading preference, frequency of newspaper reading and social media engagement as behavioural variables. Study 2 has considered gender, age, locality of residence, family structure and marital status as socio-demographic variables; nature of institute, faculty, designation, teaching experience and highest educational qualifications as academic variables; and behavioural variables remained the same as study 1.

Intellectual humility and openness were considered as dependent variables in both the studies.

The variables mentioned earlier are operationalized as following –

a. **Gender:** Although gender represents social concepts based on the biological sex, but in both the studies male and female sex were considered as levels of *gender* variable.

b. **Age:** Chronological or biological age in years was considered as *age* variable.

c. **Birth order:** Four levels of birth order were considered, i.e., first, second, third and beyond third. This variable was only considered in study 1.

d. **Locality of residence:** The nature of locality where the participants live; considered only rural and urban type in the *locality of residence* variable.

e. **Family structure:** Joint and nuclear family structure were taken as levels of *family structure* variable.

f. **Marital status:** In study 1, only two levels were considered i.e., unmarried and married. But in study 2, a third level i.e., prefer not to say was added to this variable considering the maturity of the respondents.

g. **Nature of institute:** College and university are the two levels of this variable. By nature of institute, the researcher meant broad type of higher education institutions existent in West Bengal.

h. **Faculty:** Here faculty represented the Name of faculty the students and the teachers are associated with. Considering the broad spectrum of higher educational institutions in West Bengal, four levels were selected under this variable i.e., arts/humanities/social science; commerce, law & management; engineering & technology; and science.

i. **Course level:** Study 1 considered four course level of students which they were pursuing at the time of data collection which were undergraduate, postgraduate, teacher education, and research. The teacher education level included both primary, secondary and tertiary level teacher training courses. The research level includes students from M.Phil., PhD and post-doctoral studies. In study 2, this variable was not considered.

j. **Designation:** In study 2, designation of teachers were considered as variable which included five levels i.e., part-time/guest/contractual teacher, state approved college teacher, assistant professor, associate professor, and professor.

k. **Teaching experience:** In study 2, experience of teaching was considered as a variable which was categorized in four levels – less than 5 years, between 5 & 10 years, between 10 & 20 years and more than 20 years.

l. **Highest educational qualification:** This variable was only considered in study 2 indicating four levels of educational qualifications of the teachers i.e., master's degree, M.Phil., PhD, and post-doctoral level. Master's degree was considered as threshold because as per UGC regulations, a college or university teacher must possess a master's degree as minimum eligibility criteria for teaching.

m. **Reading preference:** This variable was considered as behavioural as it represents some activities and preference of the respondents. It intended to identify what type of books and articles the respondents usually read and preferred over others. This variable had two levels i.e., fiction and non-fiction in study 1, but a third level was added in study 2 i.e., other than mentioned. The fiction category indicated examples as adventure, thriller, horror, poetry, romance, classics etc. and non-fiction category exampled biography, self-help, fact-based, essays etc. There was no example indicated for the third category.

n. **Frequency of newspaper reading:** This habit of respondents was considered as a behavioural variable with four levels i.e., almost never, rarely, sometimes when not occupied otherwise, and regularly. Both the studies have adopted this variable.'

o. **Social media engagement:** This variable was intended to measure the amount of time a respondent spends on social media popular in current time. This variable has four levels i.e., no social media account (indicative of they do not use social media), less than 1 hour, between 1 & 4 hours, and more than 4 hours. All the duration were in terms of daily usage.

p. **Intellectual humility:** It is a construct which was measured using a standardized instrument consisting of four subscales namely, independence of intellect & ego, openness to revising one's viewpoint, respecting others' viewpoints, and lack of intellectual overconfidence. The composite sum of scores in all the subscales represented the intellectual humility of the respondents.

q. **Openness:** Openness or open-mindedness is a personality trait measured using a standardized instrument.

Figure 3.2
Thematic diagram of variables

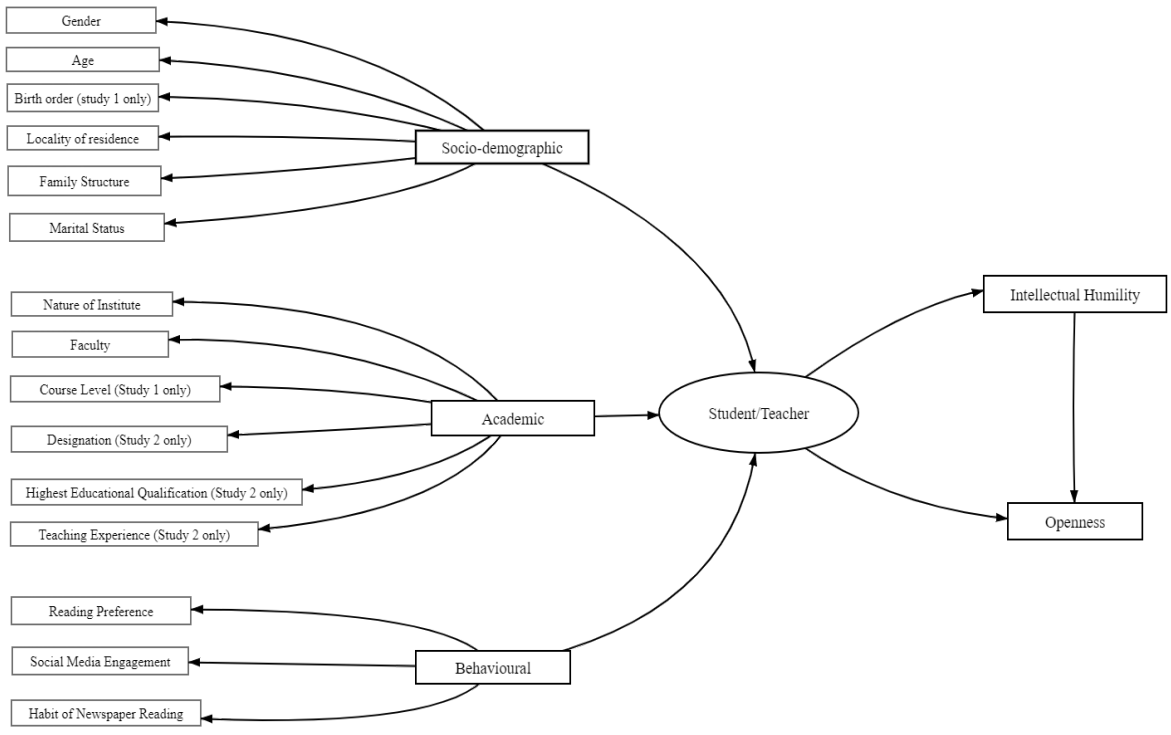


Table 3.1
Distribution of sample data based on common explanatory variables

Variable / Level	Student	Teacher	% of Total
Gender			
Female	460	83	50.28%
Male	420	117	49.72%
Age	21.99 Years	37.39 Years	-
Locality Of Residence			
Rural	479	53	49.26%
Urban	401	147	50.74%
Family Structure			
Joint Family	248	70	29.44%
Nuclear Family	632	130	70.56%
Marital Status			
Unmarried	850	58	84.07%
Married	30	138	15.55%
Prefer Not To Say	0	4	0.38%
Nature Of Institute			
College	346	134	44.44%
University	534	66	55.56%
Faculty			
Arts, Humanities And Social Sciences	613	119	67.78%
Commerce, Law & Management	164	5	15.65%
Engineering & Technology	26	14	3.70%
Science	77	62	12.87%
Reading Preference			
Fiction	628	97	67.13%
Non-Fiction	252	69	29.72%
Other Than Mentioned	0	34	3.15%
Frequency Of Newspaper Reading			
Almost Never	135	10	13.43%
Rarely	297	23	29.63%
Sometimes When Not Occupied Otherwise	234	50	26.30%
Regularly	214	117	30.65%
Social Media Engagement			
No Social Media Account	35	5	3.70%
Less Than 1 Hour	236	101	31.20%
Between 1 & 4 Hours	489	84	53.06%
More Than 4 Hours	120	10	12.04%

Table 3.2

Distribution of sample data based on explanatory variables used only in study 1

Variable / Level	N	% Of total
Course Level		
Undergraduate	450	51.14%
Postgraduate	233	26.48%
Teacher Education	105	11.93%
Research	92	10.45%
Birth Order		
First	455	51.70%
Second	290	32.95%
Third	82	9.32%
Beyond Third	53	6.02%

Table 3.3

Distribution of sample data based on explanatory variables used only in study 2

Variable / Level	N	% Of Total
Designation		
Part-Time/Guest/Contractual Faculty	5	2.50%
State Aided College Teacher	4	2.00%
Assistant Professor	162	81.00%
Associate Professor	6	3.00%
Professor	23	11.50%
Teaching Experience		
Less Than 5 Years	68	34.00%
Between 5 & 10 Years	83	41.50%
Between 10 & 20 Years	31	15.50%
More Than 20 Years	18	9.00%
Education Level		
Master's Degree	46	23.00%
M.Phil	35	17.50%
Phd	93	46.50%
Post Doctoral Level	26	13.00%

Table 3.4
Distribution of sample data based on university or affiliating university

University/Affiliating University	Student	Teacher	% of Total
Cooch Behar Panchanan Barma University	5	4	0.83%
Jadavpur University	298	34	30.74%
Kazi Nazrul University	62	15	7.13%
Netaji Subhas Open University	2	2	0.37%
Presidency University	89	3	8.52%
Raiganj University	55	1	5.19%
Sidho-Kanho-Birsha University	3	2	0.46%
University Of Burdwan	56	10	6.11%
University Of Calcutta	202	61	24.35%
University Of Gour Banga	1	2	0.28%
University Of Kalyani	8	6	1.30%
Vidyasagar University	11	10	1.94%
Visva Bharati	1	1	0.19%
Wbuttepa	9	3	1.11%
West Bengal State University	78	22	9.26%
Bankura University	0	4	0.37%
Diamond Harbour Women's University	0	2	0.19%
Jis University	0	1	0.09%
Makaut	0	8	0.74%
The Sanskrit College And University	0	1	0.09%
University Of North Bengal	0	7	0.65%
Ramkrishna Mission Vivekananda University	0	1	0.09%

Table 3.5
Distribution of sample data based on district of institute

District Of Institute	Student	Teacher	% of Total
Birbhum	2	2	0.37%
Cooch Behar	5	7	1.11%
Dakshin Dinajpur	1	1	0.19%
Hoogly	21	8	2.69%
Kolkata	404	90	45.74%
Malda	1	2	0.28%
Nadia	8	6	1.30%
North 24 Parganas	83	19	9.44%
Paschim Bardhaman	62	18	7.41%
Paschim Medinipur	11	4	1.39%
Purba Bardhaman	53	3	5.19%
Purba Medinipur	2	4	0.56%
Purulia	3	4	0.65%
South 24 Parganas	169	8	16.39%
Uttar Dinajpur	55	1	5.19%
Bankura	0	4	0.37%
Darjeeling	0	5	0.46%
Howrah	0	4	0.37%
Jalpaiguri	0	2	0.19%
Jhargram	0	3	0.28%
Murshidabad	0	5	0.46%

Figure 3.3
Variables in study 1

Figure 3.4
Variables in study 2

3.4 Instruments for data collection

The researcher has primarily made use of two standardized scales for collection of relevant data. One is on intellectual humility and the other on openness. Both the scales were administered with an information schedule (separate for students and teachers) seeking basic data on the participants which were later categorized as three type of variables i.e., socio-demographic, academic, and behavioural variables. Following are the descriptions of instruments used in this research –

A. Comprehensive Intellectual Humility Scale

This is a 22-item multi-dimensional scale for measuring intellectual humility of adults which was developed by Elizabeth J. Krumrei-Mancuso & Steven V. Rouse of Pepperdine University (Krumrei-Mancuso & Rouse, 2016). This scale measure four distinct but associated aspects of intellectual humility (IH) in a comprehensive self-reporting style. There were few other measures of intellectual humility including 9-items Intellectual Humility Scale (Porter & Schumann, 2018), 22-items Multi-dimensional Intellectual Humility Scale (Alfano et al., 2017), 2-factor Intellectual Humility Scale (McElroy et al., 2014) which all are equally good in assessing general intellectual humility. The Comprehensive Intellectual Humility Scale (CIHS) was chosen because it sees IH as both an intrapersonal and an interpersonal construct. It also sees IH as a nonthreatening awareness of one's intellectual fallibility, which leads to being open to changing one's views, not being too sure of one's own knowledge, respecting the views of others, and not feeling threatened by intellectual disagreements. Items are graded on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Score of 22 items are added together to form intellectual humility

score of the participants which ranged from 22 to 110.. Model-fit indexes for the analysed four-factor model fell within boundaries that are typical of very good fits (Kline, 2011). The whole scale coefficient alpha was.88, while the subscale alphas ranged from.73 to.89, when adults were used as the sample. The significance level of all test-retest coefficients was.001 or less. There was supporting data for all three types of validity: convergent, discriminant, and incremental (Krumrei-Mancuso & Rouse, 2016).

The four subscales of CIHS are –

Independence of Intellect and Ego (5 items)

Openness to Revising One's Viewpoint (5 items)

Respect for Others' Viewpoints (6 items)

Lack of Intellectual Overconfidence (6 items)

Among 22 items in this scale, 11 items are reverse scored to minimize item response bias. Details of the items and scoring is given in appendix 1.

Although, the scale was available for use with acknowledgement to the authors, but the researcher has taken consent from the corresponding author regarding use of the scale in the present research.

B. Openness Scale

The researcher has pooled the items relating to openness to experience from the Big Five Inventory (John & Srivastava, 1999) developed by Oliver P. John and Sanjay Srivastava of University of California at Berkley. The Big Five Inventory (BFI) is a measure of five global personality trait dimensions i.e., extraversion, agreeableness, conscientiousness, neuroticism, and openness. This 44-item measure of BFI includes

10 items on openness which was pooled and used in this research. The openness construct demonstrated a high correlation (r = .92) with the complete BFI measure. The decision of using 10 openness items of BFI scale and consider it as a standalone measure of openness was made because of high acceptability of the measure across adult samples (APA PsycNet, 2022) as well as to measure personality component of openness instead of openness to views which is already being measured by CIHS in this research. Therefore, the 10 items relating to openness (Item no. 5, 10, 15, 20, 25, 30, 35, 40, 41, 44) in the Big Five Inventory is hereafter considered as Openness Scale (OS) which includes six facets i.e., ideas, fantasy, aesthetics, actions, feelings, and values. The items are presented in a five point Likert scale ranging from strongly disagree (1) to strongly agree (5) including two items reverse scored. Score of 10 items are added together to form openness score of the participants which ranged from 10 to 50.

C. Information Summary Sheet

Two separate information schedule was prepared; one is for students (study 1) and the other for teachers (study 2). Both schedules contains some common information on –

gender, age, locality of residence, family structure, marital status, nature of institute and faculty which they are affiliated with, which type of books they prefer to read most of the time, frequency of newspaper reading, and daily hours spent on social media.

Students' information schedule sought few specific information on –

birth order, and course they are currently pursuing.

Teachers' information schedule also sought few specific information on –

current academic designation, years of teaching experience, and highest educational qualification.

3.5 Procedures of data collection

The researcher opted for collecting the data entirely through online mode to reach maximum number of participants across the state, reduce data collection time, minimize the likelihood of missing data, as well as to avoid tabulation error. Two Google forms were created (one for students, and one for teachers) incorporating intellectual humility scale, openness scale and information summary sheet. The form settings were tested and corrected by the researcher before finalisation. No personal information including name, email id or phone number were collected in the data collection forms to maintain anonymity of the participants' data. A statement of purpose was mentioned at the beginning of the forms, followed by a section for obtaining consent from the participants.

The researcher has exclusively approached the head of the institution of two universities namely Jadavpur University and Presidency University for obtaining data from its students. Rest of the students from other colleges and universities were approached individually through email. A total of 1200 students were approached out of which 880 responded and therefore constitute the participants of study 1. On the other hand, teachers' individual email addresses were obtained from UGC-Human Resource Development Centre, Jadavpur University database and official websites of the colleges and universities in West Bengal. A total of 450 teachers of 15 universities and 21 colleges were approached through email for participation out of which 200

responded. Therefore, 200 teachers were considered participants in study 2. The entire data collection process was conducted online between 27.10.2022 to 30.12.2022. Hence, this research considered the data of 1080 higher education stakeholders comprising students and teachers from 21 out of 23 districts of West Bengal, indicative of a good representation of the population of the studies.

3.6 Tabulation and statistical analyses

As the data was collected using Google Forms, a tabulation sheet for both the forms were generated from the Google server. Further, the data was cleaned and items renamed as per the criteria of variables. No addition or omission of data was made in both the tabulation sheets. The 'word-based' responses were coded into numbers and prepared for statistical data analysis software. Microsoft Excel version 16.69 was used for cleaning the tabulated response sheets. IBM SPSS version 20, Jamovi 2.3.11, JMP 17 and Intellectus Statistics were used for statistical analyses of quantitative data. Intellectus Statistics, Microsoft PowerBI and JMP 17 were used for data visualisations. The references of the research report were entirely managed by Zotero 6.0.19, following the APA 7th edition referencing style.

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CHAPTER 4

ANALYSIS AND INTERPRETATION

Chapter 4 Analysis and Interpretation

This chapter contains all the analyses of data from both the studies and their interpretations. For better comprehension, results of two studies are presented separately followed by comparison of both. Each study addressed some descriptive data as well as inferential findings. For descriptive statistics firstly, mean and standard deviation were computed and thereafter used in parametric inferential statistics like Student's t-test (for equal variance), Welch's t-test (for unequal variance), one-way ANOVA etc. For testing normality of the data, Shapiro-Wilk test was conducted prior to each inferential test. Where normality of data was not ascertained, non-parametric Mann-Whitney U test was conducted. Pearson correlation and Spearman correlation analysis were used for finding associations between intellectual humility and openness, followed by simple linear regression to predict the relationship. Path analysis model was conducted to determine whether the model of regressions accurately describe the data.

4.1 Study 1: Intellectual humility and openness of students

In this section results of the study 1 are presented in a composite manner showing the descriptive findings and inferential findings together for intellectual humility (4.1.1), openness (4.1.2) and followed by comparison and relationship (4.1.3).

4.1.1 Intellectual humility

In this part, students' intellectual humility was assessed and used to predict their openness. The following results are arranged as per statistical tests used in terms of explanatory variables.

4.1.1a Based on gender

A little mean difference in intellectual humility (IH) was found between female and male students. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution neither in the female category (α = 05, W = 0.98, p < .001) nor in the male category (α = .05, W = 0.98, p < .001). The result of Levene's test for IH was significant based on an alpha value of .05, F (1, 878) = 7.39, p = .007 indicating that the variance of IH is not equal for each category of the variable. The result of the two-tailed independent samples Welch's t-test was not significant based on an alpha value of .05, t (876.54) = 1.96, p = 0.5, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of IH was not significantly different in female and male students.

Table 4.1
Two-tailed independent samples t-test for intellectual humility by gender

	Female			Male					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	75.38	10.54	460	74.07	9.24	420	1.96	.050	0.13

Note. N = 880. Degrees of Freedom for the *t*-statistic = 876.54. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was followed and found that the distribution of IH for female students was not significantly different (α = .05, U = 102561, z = -1.58, p = .113) from the distribution of IH for

male students. The median for female (Mdn = 73.50) was not significantly higher than the median for male (Mdn = 73.00).

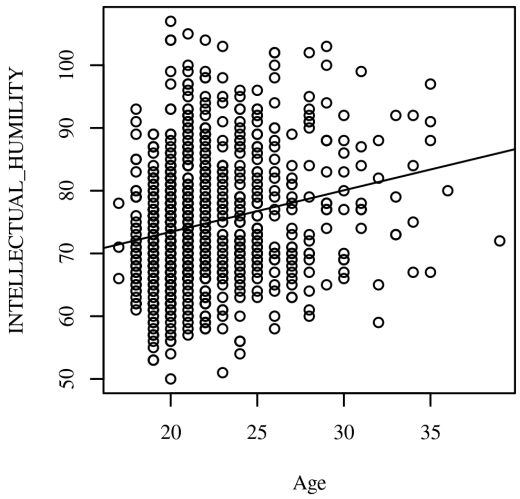
Table 4.2
Two-tailed Mann-Whitney U test for intellectual humility by gender

	Female		Male				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual Humility	453.46	460	426.31	420	102,561.00	-1.58	.113

4.1.1b Based on age

A Pearson product moment correlation analysis was conducted between age and intellectual humility. Cohen's standard was used to evaluate the strength of the relationship. A scatterplot with regression line was made and found that the pair of variables is linear.

Figure 4.1
Scatterplot with the regression line added for age and intellectual humility



The result of the correlation was examined based on an alpha value of .05. A significant positive correlation was observed between age and intellectual humility

(IH), with a correlation of .22, indicating a small effect size (p < .001, 95.00% CI = [.16, .28]). As one or more univariate outliers were detected, which can reduce the power of the Pearson correlation, a Spearman correlation was included to supplement the results, as it only requires a monotonic relationship. The result of the Spearman correlation was examined based on an alpha value of .05 which found a significant positive correlation between age and IH, with a correlation coefficient of .23, indicating a small effect size (p < .001, 95.00% CI = [.17, .29]). Therefore, results of both the correlation analysis suggests that as age increases, IH tends to increase.

Table 4.3
Correlation results between age and intellectual humility

Combination	*r*	95.00% CI	*n*	*p*
Age - Intellectual Humility (Pearson)	.22	[.16, .28]	880	< .001
Age - Intellectual Humility (Spearman)	.23	[.17, .29]	880	< .001

4.1.1c Based on birth order

It was found that intellectual humility (IH) was highest in students who are the first child of their parents and lowest in students have more than three older siblings.

Table 4.4
Mean, standard deviation and sample size for intellectual humility by birth order

Birth Order	*M*	*SD*	*n*
First	75.54	10.01	455
Second	74.38	10.06	290
Third	73.63	10.04	82
Beyond Third	71.85	7.94	53

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 2.94, p = .032, indicating there were significant differences in intellectual humility (IH) among the levels of birth order. The eta

squared was 0.01 indicating student's birth order explains approximately 1% of the variance in IH.

Table 4.5
ANOVA table for intellectual humility by birth order

Term	*SS*	*df*	*F*	*p*	η_p^2
Birth Order	868.48	3	2.94	.032	0.01
Residuals	86,213.48	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. No significant effects were found.

4.1.1d Based on locality of residence

A large mean difference in intellectual humility (IH) was found between students from rural and urban areas. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution neither in the rural category (α = 05, W = 0.98, p <.001) nor in the urban category (α = .05, W = 0.98, p < .001). The result of Levene's test for IH was significant based on an alpha value of .05, F (1, 878) = 15.64, p < .001 indicating that the variance of IH is not equal for each category of the variable. The result of the two-tailed independent samples Welch's t-test was significant based on an alpha value of .05, t (776.77) = - 6.05, p < .001, indicating the null hypothesis can be rejected. This finding suggests that the mean of IH was significantly higher in urban students compared to rural students.

Table 4.6
Two-tailed independent samples t-test for intellectual humility by locality of residence

	Rural			Urban					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	72.91	8.87	479	76.97	10.71	401	-6.05	< .001	0.41

Note. N = 880. Degrees of Freedom for the *t*-statistic = 776.77. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was used and found that the distribution of IH for rural students was significantly different (α = .05, U = 75354, z = -5.51, p < .001) from the distribution of IH for the urban category. The median for rural category (Mdn = 72.00) was significantly lower than the median for urban category (Mdn = 76.00).

Table 4.7
Two-tailed Mann-Whitney U test for intellectual humility by locality of residence

	Rural		Urban				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual Humility	397.32	479	492.08	401	75,354.00	-5.51	< .001

4.1.1e Based on family structure

A large mean difference in intellectual humility (IH) was found between students from joint family and nuclear family. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution neither in the joint family category (α = 05, W = 0.97, p <.001) nor in the nuclear family category (α = .05, W = 0.98, p < .001). The result of Levene's test for IH was significant based on an alpha value of .05, F (1, 878) = 5.13, p = .024 indicating that the variance of IH is not equal for each category of the variable. The result of the two-tailed

independent samples Welch's t-test was significant based on an alpha value of .05, t (776.77) = - 6.05, p < .001, indicating the null hypothesis can be rejected. This finding suggests that the mean of IH was significantly higher in students from nuclear family compared to students from joint family.

Table 4.8
Two-tailed independent samples t-test for intellectual humility by family structure

	Joint Family			Nuclear Family					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	72.76	9.33	248	75.54	10.09	632	-3.89	< .001	0.29

Note. N = 880. Degrees of Freedom for the *t*-statistic = 485.72. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was used and found that the distribution of IH for joint family students was significantly different (α = .05, U = 66214.5, z = -3.58, p < .001) from the distribution of IH for the nuclear family category. The median for joint family category (Mdn = 72.00) was significantly lower than the median for nuclear family category (Mdn = 74.00).

Table 4.9
Two-tailed Mann-Whitney U test for intellectual humility by family structure

	Joint Family		Nuclear Family				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual Humility	391.49	248	459.73	632	66,214.50	-3.58	< .001

4.1.1f Based on marital status

A little mean difference in intellectual humility (IH) was found between unmarried and married students. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution in the unmarried category (α

= 05, W = 0.98, p < .001) but likely to have been produced by a normal distribution in the married category (α = .05, W = 0.97, p = .578). The result of Levene's test for IH was not significant based on an alpha value of .05, F (1, 878) = 0.91, p = .341 indicating that the variance of IH is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (878) = 0.03, p = .975, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of IH was not significantly different in unmarried and married students.

Table 4.10
Two-tailed independent samples t-test for intellectual humility by marital status

	Unmarried			Married					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	74.76	9.91	850	74.70	11.39	30	0.03	.975	0.01

Note. N = 880. Degrees of Freedom for the *t*-statistic = 878. *d* represents Cohen's *d.*

As the assumptions of normality was partially violated, a two-tailed Mann-Whitney U test was followed and found that the distribution of IH for unmarried students was not significantly different (α = .05, U = 12892, z = -0.10, p = .917) from the distribution of IH for married students. The median for unmarried (Mdn = 73.00) was equal to the median for married (Mdn = 73.00) category.

Table 4.11
Two-tailed Mann-Whitney U test for intellectual humility by marital status

	Unmarried		Married				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual Humility	440.67	850	435.77	30	12,892.00	-0.10	.917

4.1.1g Based on nature of institute

A large mean difference in intellectual humility (IH) was found between students at college and university. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution neither in the college category (α = 05, W = 0.99, p = .016) nor in the university category (α = .05, W = 0.97, p < .001). The result of Levene's test for IH was significant based on an alpha value of .05, F (1, 878) = 13.27, p < .001 indicating that the variance of IH is not equal for each category of the variable. Therefore, Welch's t-test was used, which has higher statistical power than Student's t-test when the two samples have unequal variances and unequal sample sizes (Ruxton, 2006). The result of the two-tailed independent samples t-test was significant based on an alpha value of .05, t (831.01) = - 6.38, p < .001, indicating the null hypothesis can be rejected. This finding suggests that the mean of IH was significantly higher in university students compared to college students.

Table 4.12
Two-tailed independent samples t-test for intellectual humility by nature of institute

	College			University					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	72.26	8.63	348	76.39	10.42	532	-6.38	< .001	0.43

Note. N = 880. Degrees of Freedom for the *t*-statistic = 831.01. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was used and found that the distribution of IH for college students was significantly different (α = .05, U = 72379.5, z = -5.48, p < .001) from the distribution of IH for the university category. The median for college category (Mdn = 72.00) was significantly lower than the median for university category (Mdn = 75.00).

Table 4.13
Two-tailed Mann-Whitney U test for intellectual humility by nature of institute

	College		University				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual Humility	382.49	348	478.45	532	72,379.50	-5.48	< .001

4.1.1h Based on faculty

It was found that intellectual humility (IH) was highest in students of science faculty and lowest in students of arts, humanities and social sciences faculty. Following table presents faculty wise assessment score of intellectual humility.

Table 4.14
Mean, standard deviation and sample size for intellectual humility by faculty

Faculty	*M*	*SD*	*n*
Arts, Humanities and Social Sciences	74.15	10.26	613
Commerce, Law & Management	74.65	7.97	164
Engineering & Technology	78.46	9.31	26
Science	78.53	10.57	77

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 5.74, p < .001, indicating there were significant differences in intellectual humility (IH) among the levels of faculty. The eta squared was 0.02 indicating Faculty explains approximately 2% of the variance in IH.

Table 4.15
ANOVA table for intellectual humility by faculty

Term	*SS*	*df*	*F*	*p*	η_p^2
Faculty	1,678.56	3	5.74	< .001	0.02
Residuals	85,403.40	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. For the main effect of faculty, the mean of intellectual humility (IH) for arts, humanities and social sciences (M = 74.15, SD = 10.26, p = .001) and for commerce, law & management (M = 74.65, SD = 7.97) were significantly smaller than for science (M = 78.53, SD = 10.57, p = .023). No other significant effects were found.

4.1.1i Based on course level

It was found that intellectual humility (IH) was highest in students pursuing research degree and lowest in undergraduate students. Following table indicates that with increasing level of course, IH increased in the students.

Table 4.16
Mean, standard deviation and sample size for intellectual humility by course level

Course level	*M*	*SD*	*n*
Undergraduate	72.88	9.13	450
Postgraduate	75.83	9.64	233
Teacher Education	76.82	11.00	105
Research	78.88	11.30	92

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 13.57, p < .001, indicating there were significant differences in intellectual humility among the course levels. The eta squared was 0.04 indicating course level explains approximately 4% of the variance in intellectual humility.

Table 4.17
ANOVA table for intellectual humility by course level

Term	*SS*	*df*	*F*	*p*	η_p^2
Course level	3,867.30	3	13.57	< .001	0.04
Residuals	83,214.66	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. For the main effect of course level, the mean of intellectual humility (IH) for undergraduate (M = 72.88, SD = 9.13) was significantly smaller than for postgraduate students (M = 75.83, SD = 9.64), p = .001, for teacher education students (M = 76.82, SD = 11.00), p = .001 and for research students (M = 78.88, SD = 11.30), p < .001. No other significant effects were found.

4.1.1j Based on reading preference

A negligible mean difference in intellectual humility (IH) was found between students who prefer to read fiction related book and students who preferred non-fiction. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution neither in the fiction category (α = 05, W = 0.97, p <.001) nor in the non-fiction category (α = .05, W = 0.99, p = .019). The result of Levene's test for IH was not significant based on an alpha value of .05, F (1, 878) = 0.22, p = .641 indicating that the variance of IH is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (831.01) = 0.92, p = .358, indicating

the null hypothesis cannot be rejected. This finding suggests that the little difference of mean IH score was due to random chances.

Table 4.18
Two-tailed independent samples t-test for intellectual humility by reading preference

	Fiction			Non-fiction					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	74.95	9.90	628	74.27	10.09	252	0.92	.358	0.07

Note. N = 880. Degrees of Freedom for the *t*-statistic = 878. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was used and found that the distribution of IH for students who preferred 'fiction' readings was not significantly different (α = .05, U = 81500, z = -0.70, p = .486) from students who preferred 'non-fiction' readings. The median for both the fiction and non-fiction category are same (Mdn = 73.00).

Table 4.19
Two-tailed Mann-Whitney U test for intellectual humility by reading preference

	Fiction		Non-fiction				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual Humility	444.28	628	431.09	252	81,500.00	-0.70	.486

4.1.1k Based on frequency of newspaper reading

It was found that intellectual humility (IH) was highest in students who read newspaper sometimes when not occupied otherwise and lowest in students who almost do not read any form of daily newspaper.

Table 4.20
Mean, standard deviation and sample size for intellectual humility by newspaper reading

Frequency of Newspaper Reading	*M*	*SD*	*n*
Almost Never	71.83	9.77	135
Rarely	73.51	8.77	297
Sometimes When Not Occupied Otherwise	76.81	10.32	234
Regularly	76.09	10.55	214

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 10.39, p < .001, indicating there were significant differences in intellectual humility (IH) among the levels of frequency of newspaper reading. The eta squared was 0.03 indicating frequency of newspaper reading explains approximately 3% of the variance in IH.

Table 4.21
ANOVA table for intellectual humility by frequency of newspaper reading

Term	*SS*	*df*	*F*	*p*	η_p^2
Frequency of Newspaper Reading	2,992.78	3	10.39	< .001	0.03
Residuals	84,089.18	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. For the main effect of frequency of newspaper reading, the mean of intellectual humility (IH) for students who almost never read newspaper (M = 71.83, SD = 9.77) and who rarely read newspaper (M = 73.51, SD = 8.77) were significantly smaller than for 'sometimes when not occupied otherwise' category (M = 76.81, SD = 10.32) at p < .001 and for 'regularly' category (M = 76.09, SD = 10.55) at p < .001.

4.1.1| Based on social media engagement

It was found that intellectual humility (IH) was highest in students who spent around 1 to 4 hours every day on social media and lowest in students who do not use any social media so far.

Table 4.22
Mean, standard deviation and sample size for intellectual humility by social media engagement

Social Media Engagement	*M*	*SD*	*n*
Do Not Have Social Media Account	70.71	7.40	35
Less Than 1 Hour	74.29	9.72	236
Between 1 & 4 Hours	75.53	10.27	489
More Than 4 Hours	73.69	9.38	120

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 3.57, p = .014, indicating there were significant differences in intellectual humility (IH) among the levels of social media engagement. The eta squared was 0.01 indicating social media engagement explains approximately 1% of the variance in IH.

Table 4.23
ANOVA table for intellectual humility by social media engagement

Term	*SS*	*df*	*F*	*p*	η_p^2
Social Media Engagement	1,052.64	3	3.57	.014	0.01
Residuals	86,029.32	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. For the main effect of social media engagement, the

mean of intellectual humility (IH) for students not having social media account (M = 70.71, SD = 7.40) was significantly smaller than for students who use social media 'between 1 & 4 hours' category (M = 75.53, SD = 10.27), p = .029. No other significant effects were found.

4.1.2 Openness

4.1.2a Based on gender

A little mean difference in openness (OP) was found between female and male students. Shapiro-Wilk test of normality was conducted and found that OP is unlikely to have been produced by a normal distribution neither in the female category (α = 05, 05, W = 0.99, p < .001) nor in the male category (α = .05, W = 0.97, p < .001). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 878) = 1.87, p = .172 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was significant based on an alpha value of .05, t (878) = - 2.37, p = .018, indicating the null hypothesis can be rejected. This finding suggests that the mean of OP was significantly higher in male than female students.

Table 4.24
Two-tailed independent samples t-test for openness by gender

	Female			Male					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	34.09	6.39	460	35.08	5.92	420	-2.37	.018	0.16

Note. N = 880. Degrees of Freedom for the *t*-statistic = 878. *d* represents Cohen's *d.*

As the assumptions of normality was not met, a two-tailed Mann-Whitney U test was followed and found that the distribution of OP for female students was significantly different (α = .05, U = 87474.5, z = -2.43, p = .015) from the distribution of OP for male students. The median for female (Mdn = 35.00) was significantly lower than the median for male (Mdn = 36.00).

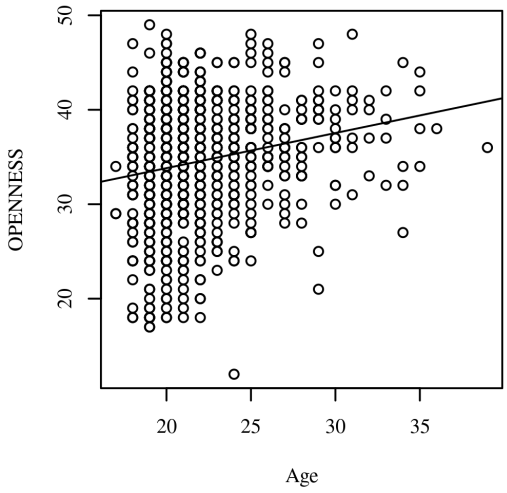
Table 4.25
Two-tailed Mann-Whitney U test for openness by gender

	Female		Male				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Openness	420.66	460	462.23	420	87,474.50	-2.43	.015

4.1.2b Based on age

A Pearson product moment correlation analysis was conducted between age and openness. Cohen's standard was used to evaluate the strength of the relationship. A scatterplot with regression line was made and found that the pair of variables is linear.

Figure 4.2
Scatterplot with the regression line added for age and openness



The result of the correlation was examined based on an alpha value of .05. A significant positive correlation was observed between age and openness (OP), with a correlation of .20, indicating a small effect size (p < .001, 95.00% CI = [.14, .26]). As one or more univariate outliers were detected, which can reduce the power of the Pearson correlation, a Spearman correlation was included to supplement the results, as it only requires a monotonic relationship. The result of the Spearman correlation was examined based on an alpha value of .05 which found a significant positive correlation between age and OP, with a correlation coefficient of .19, indicating a small effect size (p < .001, 95.00% CI = [.13, .26]). Therefore, results of both the correlation analysis suggests that as age increases, OP tends to increase.

Table 4.26
Correlation results between age and openness

Combination	*r*	95.00% CI	*n*	*p*
Age - Openness (Pearson)	.20	[.14, .26]	880	< .001
Age - Openness (Spearman)	.19	[.13, .26]	880	< .001

4.1.2c Based on birth order

It was found that openness (OP) was highest in students who are the first child of their parents and lowest in students have more than three older siblings.

Table 4.27
Mean, standard deviation and sample size for openness by birth order

Birth Order	*M*	*SD*	*n*
First	35.00	6.25	455
Second	34.66	5.80	290
Third	33.12	6.35	82
Beyond Third	32.45	6.78	53

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 4.39, p = .004, indicating there were significant differences in openness (OP) among the levels of birth order. The eta squared was 0.01 indicating student's birth order explains approximately 1% of the variance in OP.

Table 4.28
ANOVA table for openness by birth order

Term	*SS*	*df*	*F*	*p*	η_p^2
Birth Order	497.58	3	4.39	.004	0.01
Residuals	33,111.11	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. For the main effect of birth order, the mean of openness for 'first' (M = 35.00, SD = 6.25) was significantly larger than for 'beyond third' (M = 32.45, SD = 6.78), p = .023. No significant effects were found.

4.1.2d Based on locality of residence

A small mean difference in openness (OP) was found between students from rural and urban areas. Shapiro-Wilk test of normality was conducted and found that OP is unlikely to have been produced by a normal distribution neither in the rural category (α = 05, W = 0.98, p <.001) nor in the urban category (α = .05, W = 0.98, p < .001). The result of Levene's test for IH was NOT significant based on an alpha value of .05, F (1, 878) = 1.92, p = .166 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's

t-test was significant based on an alpha value of .05, t (878) = - 2.23, p = .026, indicating the null hypothesis can be rejected. This finding suggests that the mean of OP was significantly higher in urban students compared to rural students.

Table 4.29
Two-tailed independent samples t-test for openness by locality of residence

	Rural			Urban					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	34.14	5.97	479	35.07	6.40	401	-2.23	.026	0.15

Note. N = 880. Degrees of Freedom for the *t*-statistic = 878. *d* represents Cohen's *d.*

As the assumptions of normality was not met, a two-tailed Mann-Whitney U test was used and found that the distribution of OP for rural students was significantly different (α = .05, U = 86800.5, z = -2.46, p = .014) from the distribution of OP for the urban category. The median for rural category (Mdn = 35.00) was significantly lower than the median for urban category (Mdn = 36.00).

Table 4.30
Two-tailed Mann-Whitney U test for openness by locality of residence

	Rural		Urban				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Openness	421.21	479	463.54	401	86,800.50	-2.46	.014

4.1.2e Based on family structure

A small mean difference in openness (OP) was found between students from joint family and nuclear family. Shapiro-Wilk test of normality was conducted and found that OP is unlikely to have been produced by a normal distribution neither in the joint family category (α = 05, W = 0.98, p <.001) nor in the nuclear family category (α =

.05, W = 0.98, p < .001). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 878) = 0.01, p = .935 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was significant based on an alpha value of .05, t (878) = -3.01, p = .003, indicating the null hypothesis can be rejected. This finding suggests that the mean of OP was significantly higher in students from nuclear family compared to students from joint family.

Table 4.31
Two-tailed independent samples t-test for openness by family structure

	Joint Family			Nuclear Family					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	33.56	6.24	248	34.95	6.12	632	-3.01	.003	0.22

Note. N = 880. Degrees of Freedom for the *t*-statistic = 878. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was used and found that the distribution of OP for joint family students was significantly different (α = .05, U = 68164, z = -3.01, p = .003) from the distribution of OP for the nuclear family category. The median for joint family category (Mdn = 34.00) was significantly lower than the median for nuclear family category (Mdn = 36.00).

Table 4.32
Two-tailed Mann-Whitney U test for openness by family structure

	Joint Family		Nuclear Family				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Openness	399.35	248	456.65	632	68,164.00	-3.01	.003

4.1.2f Based on marital status

A little mean difference in openness (OP) was found between unmarried and married students. Shapiro-Wilk test of normality was conducted and found that OP is unlikely to have been produced by a normal distribution in the unmarried category (α = 05, W = 0.98, p < .001) but likely to have been produced by a normal distribution in the married category (α = .05, W = 0.96, p = .385). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 878) = 0.85, p = .356 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (878) = - 1, p = .319, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of OP was not significantly different in unmarried and married students.

Table 4.33
Two-tailed independent samples t-test for openness by marital status

	Unmarried			Married					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	34.52	6.19	850	35.67	5.93	30	-1.00	.319	0.19

Note. N = 880. Degrees of Freedom for the *t*-statistic = 878. *D* represents Cohen's *d.*

As the assumptions of normality was partially violated, a two-tailed Mann-Whitney U test was followed and found that the distribution of OP for unmarried students was not significantly different (α = .05, U = 11563, z = -0.87, p = .385) from the distribution of OP for married students. The median for unmarried (Mdn = 35.00) was not significantly lower than the median for married (Mdn = 36.00) category.

Table 4.34
Two-tailed Mann-Whitney U test for openness by marital status

	Unmarried		Married				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Openness	439.10	850	480.07	30	11,563.00	-0.87	.385

4.1.2g Based on nature of institute

A small mean difference in openness (OP) was found between students at college and university. Shapiro-Wilk test of normality was conducted and found that OP is unlikely to have been produced by a normal distribution neither in the college category (α = 05, W = 0.98, p < .001) nor in the university category (α = .05, W = 0.98, p < .001). The result of Levene's test for OP was significant based on an alpha value of .05, F (1, 878) = 11.41, p < .001 indicating that the variance of OP is not equal for each category of the variable. Therefore, Welch's t-test was used, which has higher statistical power than Student's t-test when the two samples have unequal variances and unequal sample sizes (Ruxton, 2006). The result of the two-tailed independent samples t-test was significant based on an alpha value of .05, t (666.20) = - 2.23, p = .026, indicating the null hypothesis can be rejected. This finding suggests that the mean of OP was significantly higher in university students compared to college students.

Table 4.35
Two-tailed independent samples t-test for openness by nature of institute

	College			University					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	33.97	6.70	348	34.95	5.80	532	-2.23	.026	0.16

Note. N = 880. Degrees of Freedom for the *t*-statistic = 666.20. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was used and found that the distribution of OP for college students was not significantly different (α = .05, U = 85399.5, z = -1.95, p = .052) from the distribution of OP for the university category. The median for college category (Mdn = 34.50) was not significantly lower than the median for university category (Mdn = 35.00).

Table 4.36
Two-tailed Mann-Whitney U test for openness by nature of institute

	College		University				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Openness	419.90	348	453.97	532	85,399.50	-1.95	.052

4.1.2h Based on faculty

It was found that openness (OP) was highest in students of commerce, law & management faculty and lowest in students of arts, humanities and social sciences faculty. Following table presents faculty wise assessment score of openness.

Table 4.37
Mean, standard deviation and sample size for openness by faculty

Faculty	*M*	*SD*	*n*
Arts, Humanities and Social Sciences	33.90	6.43	613
Commerce, Law & Management	37.02	5.17	164
Engineering & Technology	34.50	5.83	26
Science	34.65	4.95	77

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 11.40, p < .001, indicating there were significant differences in openness (OP) among the levels of faculty. The eta squared was 0.04 indicating Faculty explains approximately 4% of the variance in OP.

Table 4.38
ANOVA table for openness by faculty

Term	*SS*	*df*	*F*	*p*	η_p^2
Faculty	1,262.39	3	11.40	< .001	0.04
Residuals	32,346.30	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. For the main effect of faculty, the mean of openness (OP) for arts, humanities and social sciences (M = 33.90, SD = 6.43) and for science (M = 34.65, SD = 4.95) were significantly smaller than for commerce, law & management (M = 37.02, SD = 5.17) at $p < .001$ and $p = .025$ respectively.

4.1.2i Based on course level

It was found that openness (OP) was highest in students pursuing research degree and lowest in undergraduate students. Following table indicates that with increasing level of course, openness increased in the students.

Table 4.39
Mean, standard deviation and sample size for openness by course level

Course level	*M*	*SD*	*n*
Undergraduate	33.54	6.68	450
Postgraduate	35.12	5.17	233
Teacher Education	35.85	6.06	105
Research	36.70	5.12	92

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 876) = 10.24, p < .001, indicating there were significant differences in openness among the course levels. The eta squared was 0.03 indicating course level explains approximately 3% of the variance in openness.

Table 4.40
ANOVA table for openness by course level

Term	*SS*	*df*	*F*	*p*	η_p^2
Course level	1,139.08	3	10.24	< .001	0.03
Residuals	32,469.61	876			

For Post-hoc, the Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. For the main effect of course level, the mean of openness (OP) for undergraduate (M = 33.54, SD = 6.68) was significantly smaller than for postgraduate students (M = 35.12, SD = 5.17, p = .007), for teacher education students (M = 35.85, SD = 6.06, p = .003) and for research students (M = 36.70, SD = 5.12, p < .001).

4.1.2j Based on reading preference

A negligible mean difference in openness (OP) was found between students who prefer to read fiction related books and students who preferred non-fiction. Shapiro-Wilk test of normality was conducted and found that OP is unlikely to have been produced by a normal distribution neither in the fiction category (α = 05, W = 0.98, p <.001) nor in the non-fiction category (α = .05, W = 0.97, p < .001). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 878) =

2.11, p = .147 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (878) = - 0.50, p = .617, indicating the null hypothesis cannot be rejected. This finding suggests that the little difference of mean OP score was due to random chances.

Table 4.41
Two-tailed independent samples t-test for openness by reading preference

	Fiction			Non-fiction					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	34.50	6.28	628	34.73	5.94	252	-0.50	.617	0.04

Note. N = 880. Degrees of Freedom for the *t*-statistic = 878. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was used and found that the distribution of OP for students who preferred 'fiction' readings was not significantly different (α = .05, U = 77326.5, z = -0.53, p = .597) from students who preferred 'non-fiction' readings. The median for both the fiction and non-fiction category are same (Mdn = 35.00).

Table 4.42
Two-tailed Mann-Whitney U test for openness by reading preference

	Fiction		Non-fiction				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Openness	437.63	628	447.65	252	77,326.50	-0.53	.597

4.1.2k Based on frequency of newspaper reading

It was found that openness (OP) was highest in students who read newspaper regularly and lowest in students who almost do not read any form of daily newspaper.

Table 4.43
Mean, standard deviation and sample size for openness by newspaper reading

Frequency of Newspaper Reading	*M*	*SD*	*n*
Almost Never	31.97	6.58	135
Rarely	34.57	5.90	297
Sometimes When Not Occupied Otherwise	35.28	5.88	234
Regularly	35.41	6.23	214

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, $F (3, 876) = 10.62$, $p < .001$, indicating there were significant differences in openness (OP) among the levels of frequency of newspaper reading. The eta squared was 0.04 indicating frequency of newspaper reading explains approximately 4% of the variance in OP.

Table 4.44
ANOVA table for openness by frequency of newspaper reading

Term	*SS*	*df*	*F*	*p*	η_p^2
Frequency of Newspaper Reading	1,179.26	3	10.62	< .001	0.04
Residuals	32,429.43	876			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. For the main effect of frequency of newspaper reading, the mean of openness (OP) for students who almost never read newspaper ($M = 31.97$, $SD = 6.58$) were significantly smaller than who rarely read newspaper ($M = 34.57$, $SD = 5.90$, $p < .001$), for 'sometimes

when not occupied otherwise' category (M = 35.28, SD = 5.88), p < .001) and for 'regularly' category (M = 35.41, SD = 6.23, p < .001).

4.1.2l Based on social media engagement

It was found that openness (OP) was highest in students who spent around 1 to 4 hours every day on social media and lowest in students who do not use any social media so far.

Table 4.45
Mean, standard deviation and sample size for openness by social media engagement

Social Media Engagement	*M*	*SD*	*n*
Do Not Have Social Media Account	32.46	6.94	35
Less Than 1 Hour	34.13	6.58	236
Between 1 & 4 Hours	34.92	5.96	489
More Than 4 Hours	34.58	5.94	120

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 876) = 2.29, p = .077, indicating there were no significant differences in openness (OP) among the levels of social media engagement.

Table 4.46
ANOVA table for openness by social media engagement

Term	*SS*	*df*	*F*	*p*	η_p^2
Social Media Engagement	261.09	3	2.29	.077	0.01
Residuals	33,347.60	876			

4.1.3 Comparison and relationship: Students' intellectual humility and openness

This section represents detailed comparison between descriptive statistics on students' intellectual humility and openness in terms of three category of explanatory variables i.e., socio-demographic, academic and behavioural variables. A comparison was also made among the universities based certain parameters i.e., locality of the university, NAAC grade etc. Latter part of this section has highlighted the relationship between students' intellectual humility and openness along with moderating effects of explanatory variables on the relationship.

4.1.3a Comparison based on socio-demographic variables

Table 4.47
Descriptive statistics comparing intellectual humility and openness by socio-demographic variables

Variable	*Levels*	*Sample size*	*Intellectual humility Mean (SD)*	*Openness Mean (SD)*
Gender	Female	460	75.38 (10.54)	34.09 (6.39)
	Male	420	74.07 (9.24)	35.08 (5.92)
Age	17 - 39	880	r = .22, .23	r = .20, .19
Birth order	First	455	75.54 (10.01)	35 (6.25)
	Second	290	74.38 (10.06)	34.66 (5.80)
	Third	82	73.63 (10.04)	33.12 (6.35)
	Beyond Third	53	71.85 (7.94)	32.45 (6.78)
Locality of residence	Rural	479	72.91 (8.87)	34.14 (5.97)
	Urban	401	76.97 (10.71)	35.07 (6.40)
Family structure	Joint family	248	72.76 (9.33)	33.56 (6.24)
	Nuclear family	632	75.54 (10.09)	34.95 (6.12)
Marital status	Unmarried	850	74.76 (9.91)	34.52 (6.19)
	Married	30	74.70 (11.39)	35.67 (5.93)

4.1.3b Comparison based on academic variables

Table 4.48
Descriptive statistics comparing intellectual humility and openness by academic variables

Variable	*Levels*	*Sample size*	*Intellectual humility Mean (SD)*	*Openness Mean (SD)*
Nature of institute	College	348	72.26 (8.63)	33.97 (6.70)
	University	532	76.39 (10.42)	34.95 (5.80)
Faculty	Arts, Humanities and Social Sciences	613	74.15 (10.26)	33.90 (6.43)
	Commerce, Law & Management	164	74.65 (7.97)	37.02 (5.17)
	Engineering & Technology	26	78.46 (9.31)	34.50 (5.83)
	Science	77	78.53 (10.57)	34.65 (4.95)
Course level	Undergraduate	450	72.88 (9.13)	33.54 (6.68)
	Postgraduate	233	75.83 (9.64)	35.12 (5.17)
	Teacher Education	105	76.82 (11.00)	35.85 (6.06)
	Research	92	78.88 (11.30)	36.70 (5.12)

4.1.3c Comparison based on behavioural variables

Table 4.49
Descriptive statistics comparing intellectual humility and openness by behavioural variables

Variable	*Levels*	*Sample size*	*Intellectual humility Mean (SD)*	*Openness Mean (SD)*
Reading preference	Fiction	628	74.95 (9.90)	34.50 (6.28)
	Non-fiction	252	74.27 (10.09)	34.73 (5.94)
Frequency of newspaper reading	Almost never	135	71.83 (9.77)	31.97 (6.58)
	Rarely	297	73.51 (8.77)	34.57 (5.90)
	Sometimes When Not Occupied Otherwise	234	76.81 (10.32)	35.28 (5.88)
	Regularly	214	76.09 (10.55)	35.41 (6.23)
Social media engagement	Do not have social media account	35	70.71 (7.40)	32.46 (6.94)
	Less than 1 hour	236	74.29 (9.72)	34.13 (6.58)
	Between 1 & 4 hours	489	75.53 (10.27)	34.92 (5.96)
	More than 4 hours	120	73.69 (9.38)	34.58 (5.94)

4.1.3d Comparison based on university

One of the objectives of this study was to see if overall environment and performance of educational institution have any impact on students' intellectual humility and openness. Intellectual humility and openness of participating students in respect to different universities or affiliating universities are therefore summarized. College students' data was put under the criteria of affiliating university. Hence, Table 4.50 contains data of 348 college students and 532 university students.

Table 4.50
Descriptive statistics comparing intellectual humility and openness of students by university

University	*Locality*	*NAAC Grade**	*Sample size*	*Intellectual humility (Mean)*	*Openness (Mean)*
Cooch Behar Panchanan Barma University	Urban	Nil	5	77.6	33.6
Jadavpur University	Metropolitan	A	298	77.4	36.13
Kazi Nazrul University	Urban	B	62	71.73	32.58
Netaji Subhas Open University	Metropolitan	A	2	74.5	32.5
Presidency University	Metropolitan	A	89	82.35	36.03
Raiganj University	Urban	Nil	55	67.67	29.45
Sidho-Kanho-Birsha University	Urban	B+	3	73.67	37.33
University of Burdwan	Urban	A	56	66.8	29.48
University of Calcutta	Metropolitan	A	202	74.59	36.73
University of Gour Banga	Urban	B	1	70	31
University of Kalyani	Urban	A	8	75.38	37.13
Vidyasagar University	Urban	B++	11	72.36	35.27
Visva Bharati	Urban	B+	1	81	44
WBUTTEPA	Metropolitan	Nil	9	76	35.56
West Bengal State University	Urban	B	78	69.53	29.56

* Source: National Assessment and Accreditation Council, India (2022)

Again, data of participating students studying exclusively in university are presented in Table 4.51 for further comparison based on aforesaid parameters. For convenience of analysis, only two categories were assumed for the universities where the A-

category included universities with NAAC grade A, and B-category includes universities with NAAC grades B++, B+, B, NAAC grade not assigned (Nil). Therefore, *Category* column of the Table 4.51 represent the new assumed grade of university i.e., A-category and B-category.

Table 4.51
Descriptive statistics comparing intellectual humility and openness of students studying at university

University	*Locality*	*Category*	*Sample size*	*Intellectual humility (Mean)*	*Openness (Mean)*
Cooch Behar Panchanan Barma University	Urban	B	4	75	32.5
Jadavpur University	Metropolitan	A	298	77.4	36.13
Kazi Nazrul University	Urban	B	62	71.73	32.58
Netaji Subhas Open University	Metropolitan	A	2	74.5	32.5
Presidency University	Metropolitan	A	89	82.35	36.03
Raiganj University	Urban	B	55	67.67	29.45
Sidho-Kanho-Birsha University	Urban	B	3	73.67	37.33
University of Calcutta	Metropolitan	A	3	63	32
University of Kalyani	Urban	A	8	75.38	37.13
Vidyasagar University	Urban	B	1	76	24
Visva Bharati	Urban	B	1	81	44
WBUTTEPA	Metropolitan	B	6	77.17	36.17
West Bengal State University	Urban	B	2	74.5	35

Further, the universities are shortlisted based on number of responses in the present study with minimum criteria of selection at N > = 30. Only four universities namely Jadavpur University, Kazi Nazrul University, Presidency University and Raiganj University are included as fulfilling the researcher's criteria and is presented in the following table.

Table 4.52
Comparing intellectual humility and openness of students at selected universities (N >= 30)

University	*Locality*	*Category*	*Sample size*	*Intellectual humility (Mean)*	*Openness (Mean)*
Jadavpur University	Metropolitan	A	298	77.4	36.13
Kazi Nazrul University	Urban	B	62	71.73	32.58
Presidency University	Metropolitan	A	89	82.35	36.03
Raiganj University	Urban	B	55	67.67	29.45

It was found that the students studying at universities in metropolitan area and with higher academic grade were more intellectually humble and their openness was also higher compared to students studying at universities in urban area and comparatively lower academic grade.

Shapiro-Wilk test of normality was conducted and found that both intellectual humility (IH) and openness (OP) are unlikely to have been produced by a normal distribution neither in the A-category university (IH: $W = 0.95$, $p < .001$, OP: $W = 0.98$, $p < .001$) nor in the B-category (IH: $W = 0.95$, $p < .001$, OP: $W = 0.98$, $p < .001$). The result of Levene's test for IH was significant based on an alpha value of .05, $F (1, 502) = 35.17$, $p < .001$ and for OP was not significant based on alpha value of .05, $F (1, 502) = 2.58$, $p = .109$ indicating that the variance of IH is not equal and of OP is equal for each category of the variable. Therefore, two separate Welch's t-test were used, which has higher statistical power than Student's t-test when the two samples have unequal variances and unequal sample sizes (Ruxton, 2006).

Table 4.53
Two-tailed independent samples t-tests for intellectual humility and openness by selected universities

	A-category University			B-category University					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	78.53	10.58	387	69.82	6.82	117	10.52	< .001	0.98
Openness	36.11	5.28	387	31.11	6.03	117	8.66	< .001	0.88

Note. N = 880. Degrees of Freedom for the *t*-statistic (IH) = 298.96, *t*-statistic (OP) = 502. *d* represents Cohen's *d.*

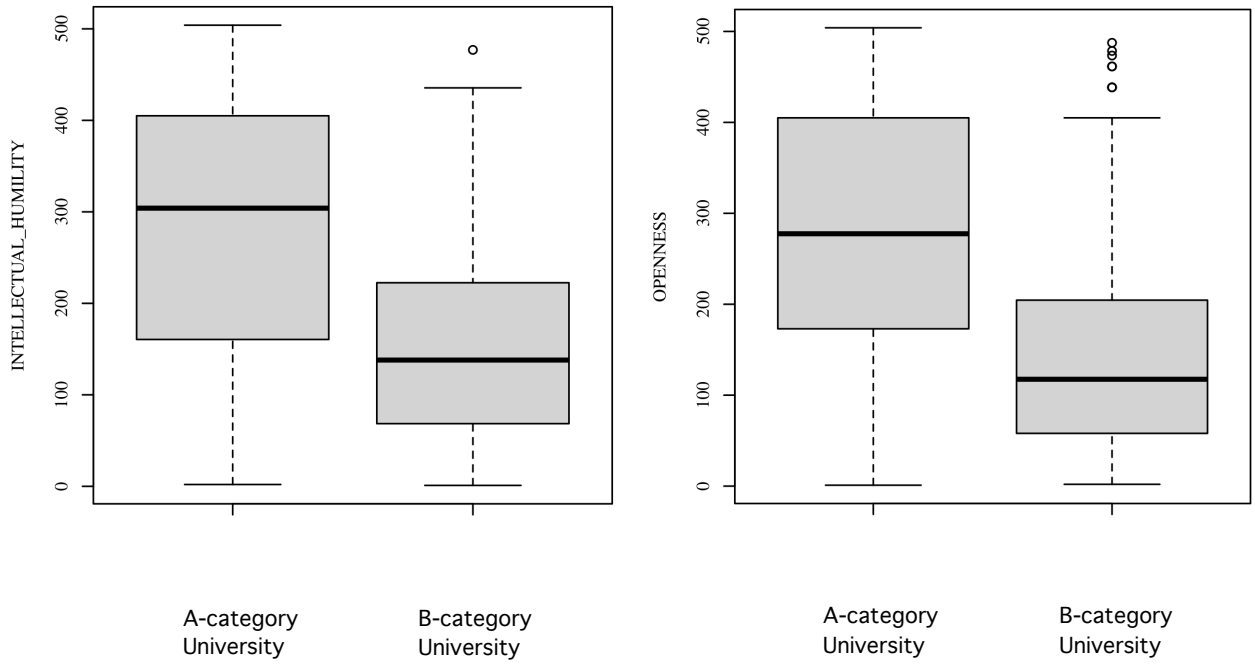
As the assumptions of normality was violated, two separate two-tailed Mann-Whitney U test were used and found that the distribution of IH and OP for students of A-category universities was significantly different (IH: α = .05, U = 34147.5, z = -8.34, p < .001, OP: α = .05, U = 33606.5, z = -7.96, p < .001) from students of B-category universities. The median of intellectual humility and openness for A-category (IH: Mdn = 78.00, OP: Mdn = 36.00) was significantly higher than B-category (IH: Mdn = 69.00, OP: Mdn = 31.00).

Table 4.54
Two-tailed Mann-Whitney U tests for intellectual humility and openness by selected universities

	A-category University		B-category University				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual humility	282.24	387	154.14	117	34,147.50	-8.34	< .001
Openness	280.84	387	158.76	117	33,606.50	-7.96	< .001

Figure 4.3

Ranks of intellectual humility and openness by selected university category

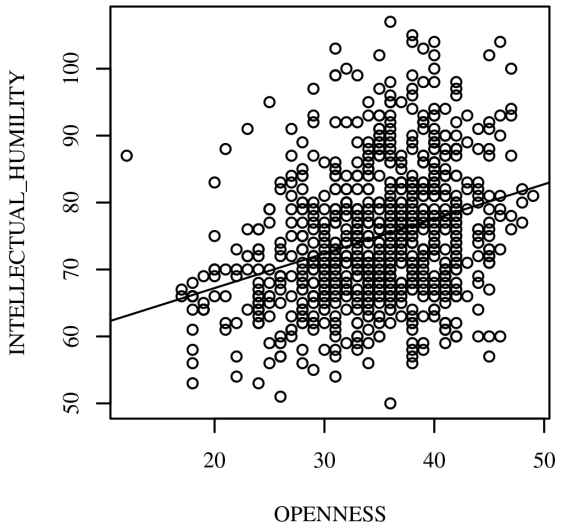


Therefore, it is evident that the students of A-category universities i.e., Jadavpur University and Presidency University are significantly more intellectually humble and open than students of B-category universities i.e., Kazi Nazrul University and Raignaj University as per the selection criteria. Overall, the descriptive data shows that these two A-category universities are in better position in terms of intellectual humility and openness of students when compared to other universities or affiliating colleges under this study.

4.1.3e Correlation between intellectual humility and openness

A Pearson product moment correlation analysis was conducted between intellectual humility and openness. Cohen's standard was used to evaluate the strength of the relationship. A scatterplot with regression line was made and found that the pair of variables is linear.

Figure 4.4
Scatterplot with the regression line added for students' intellectual humility and



The result of the correlation was examined based on an alpha value of .05. A significant positive correlation was observed between intellectual humility (IH) and openness (OP), with a correlation of .32, indicating a moderate effect size ($p < .001$, 95.00% CI = [.26, .38]). It suggests that as intellectual humility increases, openness tends to increase among students.

Table 4.55
Correlation results between students' intellectual humility and openness

Combination	*r*	95.00% CI	*n*	*p*
Intellectual humility - Openness	.32	[.26, .38]	880	< .001

Further, four separate Pearson correlation analysis were computed taking the sub-scales of intellectual humility i.e., Independence of Intellect and Ego (IIE), Openness to Revising One's Viewpoint (OROV), Respect for Others' Viewpoints (ROV) and Lack of Intellectual Overconfidence (LIO) individually with openness (OP) to see effect size of particular factors of intellectual humility in the association with openness. Four scatterplots were made for each pair of association followed by the effect size in the Table 4.56.

Figure 4.5

Scatterplots with the regression line added for factors of students' intellectual humility and openness

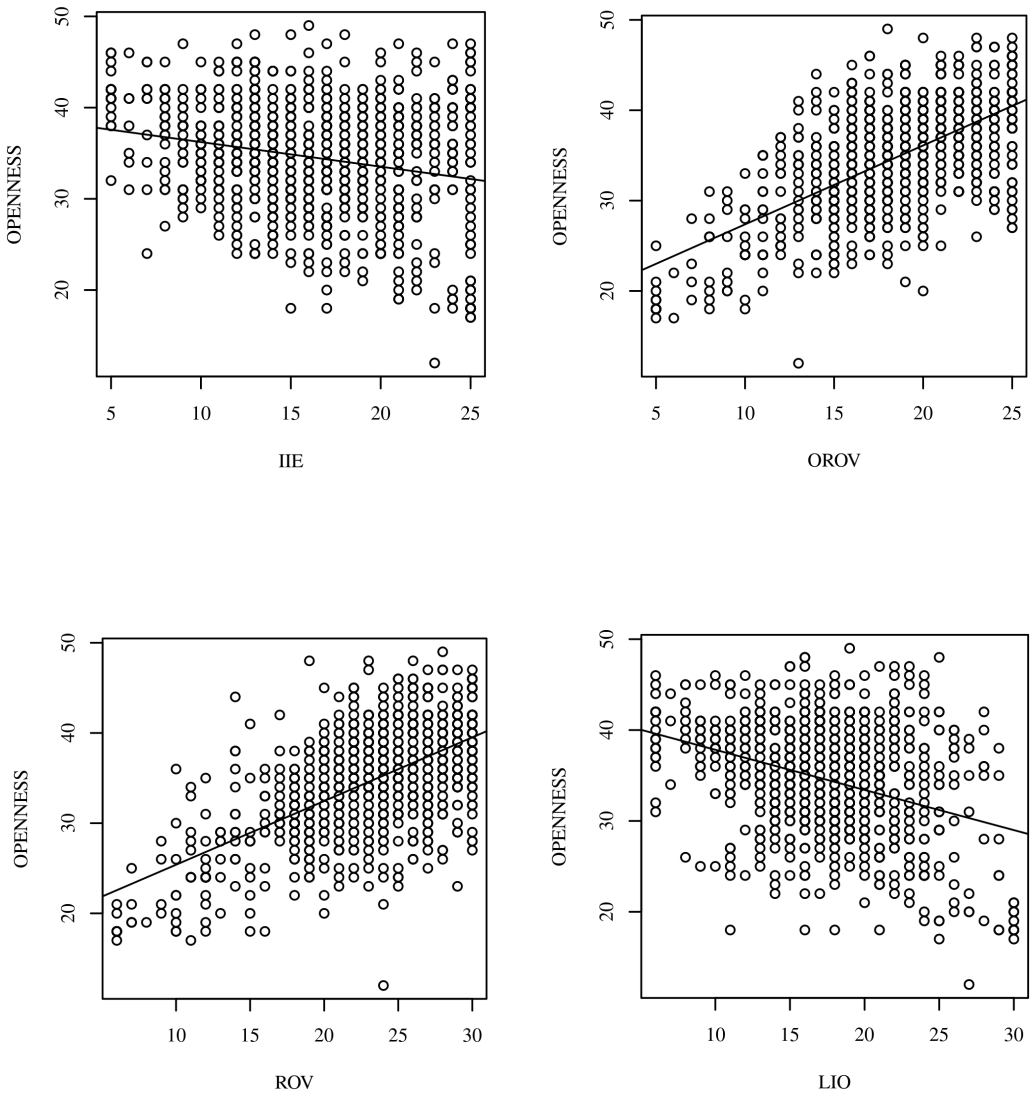


Table 4.56
Correlation results between factors of students' intellectual humility and openness

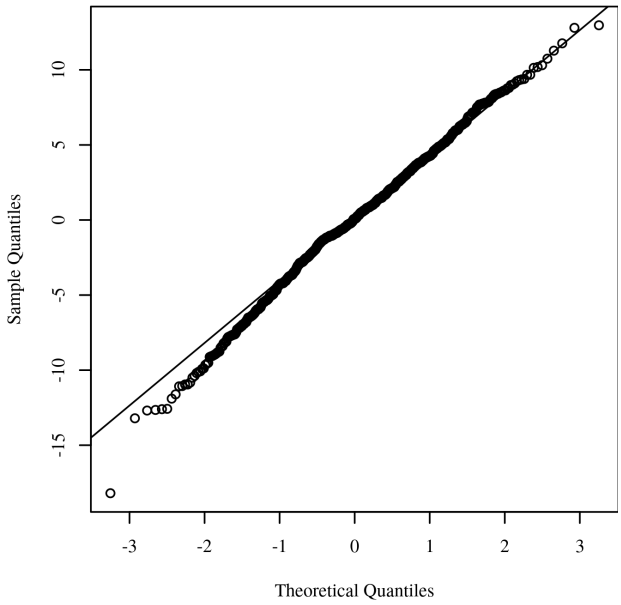
Combination	*r*	95.00% CI	*n*	*p*
IIE - Openness	-.22	[-.28, -.15]	880	< .001
OROV - Openness	.62	[.58, .66]	880	< .001
ROV - Openness	.61	[.57, .65]	880	< .001
LIO - Openness	-.35	[-.40, -.29]	880	< .001

A significant negative correlation was observed between IIE and openness, with a correlation of -.22, indicating a small effect size ($p < .001$, 95.00% CI = [-.28, -.15]). This suggests that as IIE increases, openness tends to decrease. A significant positive correlation was observed between OROV and openness, with a correlation of .62, indicating a large effect size ($p < .001$, 95.00% CI = [.58, .66]). This suggests that as OROV increases, openness tends to increase. A significant positive correlation was observed between ROV and openness, with a correlation of .61, indicating a large effect size ($p < .001$, 95.00% CI = [.57, .65]). This suggests that as ROV increases, openness tends to increase. A significant negative correlation was observed between LIO and openness, with a correlation of -.35, indicating a moderate effect size ($p < .001$, 95.00% CI = [-.40, -.29]). This suggests that as LIO increases, openness tends to decrease.

4.1.3f Intellectual humility predicting openness in students

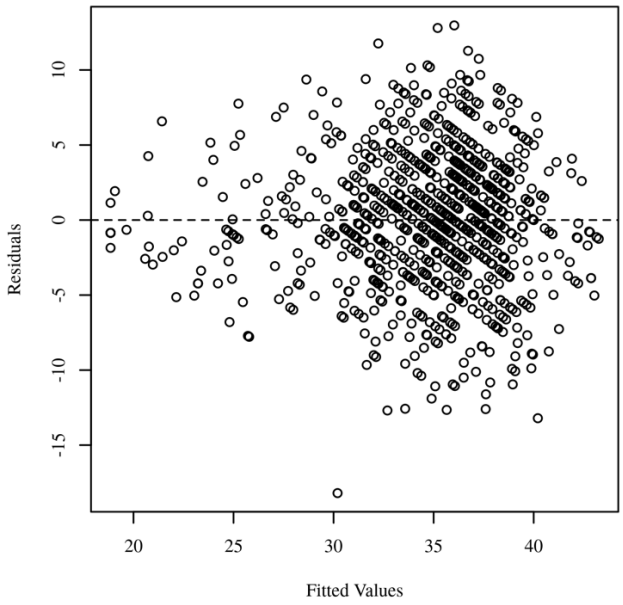
As it was seen earlier that individual effect size varied for the association of each pair of factors of intellectual humility and openness, a linear regression analysis was computed to assess whether Independence of Intellect and Ego (IIE), Openness to Revising One's Viewpoint (OROV), Respect for Others' Viewpoints (ROV) and Lack of Intellectual Overconfidence (LIO) significantly predicted Openness (OH) of students. The assumption of normality was assessed plotting the quantiles of the model residuals against the quantiles of a Chi-square distribution (Q-Q scatterplot) where it was seen that no strong deviation of quantiles of the residuals were there from the theoretical quantiles indicating the reliability of the parameter estimates.

Figure 4.6
Q-Q scatterplot for normality of the residuals for the regression model (IIE, OROV, ROV, ILO & OP)



Homoscedasticity was evaluated by plotting the residuals against the predicted values (Bates et al., 2014; Field, 2017; Osborne & Walters, 2002). The assumption of homoscedasticity is met as the points appear randomly distributed with a mean of zero and no apparent curvature as seen in Figure 4.7.

Figure 4.7
Residuals scatterplot testing homoscedasticity (IIE, OROV, ROV, ILO & OP)



Variance Inflation Factors (VIFs) were calculated to detect the presence of multicollinearity between predictors and found that the VIFs for all the factors of intellectual humility are below 5 indicating negligible presence of multicollinearity.

Table 4.57
Variance Inflation Factors for IIE, OROV, ROV, and LIO

Factors of intellectual humility (Variable)	VIF
IIE	1.14
OROV	1.92
ROV	1.89
LIO	1.19

The results of the linear regression model were significant, $F(4,875) = 196.98$, $p < .001$, $R^2 = .47$, indicating that approximately 47.38% of the variance in openness

(OP) is explainable by IIE, OROV, ROV, and LIO. IIE did not significantly predict openness, B = -0.05, $t(875)$ = -1.69, p = .092. Based on this sample, a one-unit increase in IIE does not have a significant effect on openness. OROV significantly predicted openness, B = 0.50, $t(875)$ = 10.38, p < .001 indicating on average, a one-unit increase of OROV will increase the value of openness by 0.50 units. ROV significantly predicted openness, B = 0.37, $t(875)$ = 9.52, p < .001. This indicates that on average, a one-unit increase of ROV will increase the value of openness by 0.37 units. LIO significantly predicted openness, B = -0.18, $t(875)$ = -5.41, p < .001 indicating on average, a one-unit increase of LIO will decrease the value of openness by 0.18 units. Table 4.58 summarizes the results of the regression model.

Table 4.58
Results for Linear Regression with IIE, OROV, ROV, and LIO predicting Openness

Variable	*B*	*SE*	95.00% CI	β	*t*	*p*
(Intercept)	21.05	1.16	[18.77, 23.32]	0.00	18.15	< .001
IIE	-0.05	0.03	[-0.12, 0.009]	-0.04	-1.69	.092
OROV	0.50	0.05	[0.40, 0.59]	0.35	10.38	< .001
ROV	0.37	0.04	[0.30, 0.45]	0.32	9.52	< .001
LIO	-0.18	0.03	[-0.25, -0.12]	-0.14	-5.41	< .001

Note. Results: $F(4,875) = 196.98$, $p < .001$, $R^2 = .47$
Unstandardized Regression Equation: Openness = 21.05 - 0.05*IIE + 0.50*OROV + 0.37*ROV - 0.18*LIO

4.2 Study 2: Intellectual humility and openness in teachers

In this section results of the study 2 are presented in a composite manner showing the descriptive findings and inferential findings together for teachers' intellectual humility (4.2.1), openness (4.2.2) and followed by comparison and relationship (4.2.3).

4.2.1 Intellectual humility in teachers

In this part, teachers' intellectual humility was assessed and used to predict their openness. The following results are arranged as per statistical tests used in terms of explanatory variables.

4.2.1a Based on teachers' gender

A negligible mean difference in intellectual humility (IH) was found between female and male teachers. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution in the female category (α = 05, W = 0.97, p = .044) but likely in the male category (α = .05, W = 0.98, p = .082). The result of Levene's test for IH was significant based on an alpha value of .05, F (1, 198) = 0.44, p = .507 indicating that the variance of IH is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (198) = -0.16, p = 0.872, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of IH was not significantly different in female and male teachers.

Table 4.59
Two-tailed independent samples t-test for teachers' intellectual humility by gender

Variable	Female			Male			*t*	*p*	*d*
	M	*SD*	*n*	*M*	*SD*	*n*			
Intellectual Humility	81.10	9.83	83	81.32	9.86	117	-0.16	.872	0.02

Note. N = 200. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was followed and found that the distribution of IH for female teachers was not significantly different (α = .05, U = 4876.5, z = -0.05, p = .958) from the distribution of IH for male teachers. The median for female (Mdn = 80.00) was not significantly lower than the median for male (Mdn = 81.00).

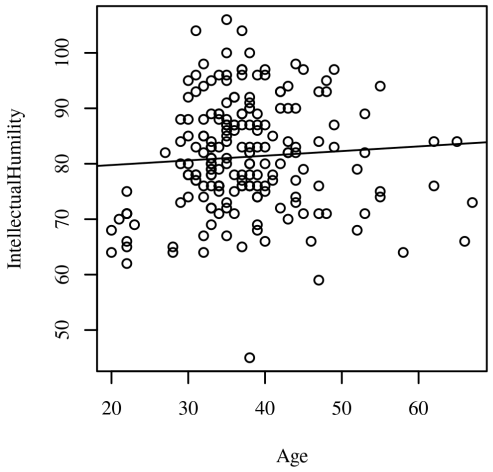
Table 4.60
Two-tailed Mann-Whitney U test for teachers' intellectual humility by gender

Variable	Female		Male		*U*	*z*	*p*
	Mean Rank	*n*	Mean Rank	*n*			
Intellectual Humility	100.75	83	100.32	117	4,876.50	-0.05	.958

4.2.1b Based on teachers' age

A Pearson product moment correlation analysis was conducted between age and intellectual humility. Cohen's standard was used to evaluate the strength of the relationship. A scatterplot with regression line was made and found that the pair of variables is linear.

Figure 4.8
Scatterplot with the regression line added for teachers' age and intellectual humility



The result of the correlation was examined based on an alpha value of .05. No significant correlation was observed between age and intellectual humility (IH), with a correlation of .07, indicating a very small effect size (p = .323, 95.00% CI = [.07, .21]). As one or more univariate outliers were detected, which can reduce the power of the Pearson correlation, a Spearman correlation was included to supplement the results. The result of the Spearman correlation was examined based on an alpha value of .05 which found no significant correlation between age and IH, with a correlation coefficient of .10, indicating a very small effect size (p = .142, 95.00% CI = [-.03, .24]). Therefore, results of both the correlation analysis suggests that as age and intellectual humility in teachers has no such relationship.

Table 4.61
Correlation results between teachers' age and intellectual humility

Combination	*r*	95.00% CI	*n*	*p*
Age - Intellectual Humility (Pearson)	.07	[-.07, .21]	200	.323
Age - Intellectual Humility (Spearman)	.10	[-.03, .24]	200	.142

4.2.1c Based on teachers' locality of residence

A large mean difference in intellectual humility (IH) was found between teachers from rural and urban areas. Shapiro-Wilk test of normality was conducted and found that IH is likely to have been produced by a normal distribution in both the rural category (α = 05, W = 0.97, p = .255) and urban category (α = .05, W = 0.98, p = .104). The result of Levene's test for IH was not significant based on an alpha value of .05, F (1, 198) = 0.78, p = .378 indicating that the variance of IH is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was significant based on an alpha value of .05, t (198) = - 3.80, p < .001. This finding suggests that the mean of IH was significantly higher in urban teachers compared to rural teachers.

Table 4.62
Two-tailed independent samples t-test for teachers' intellectual humility by locality of residence

	Rural			Urban					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	76.98	8.66	53	82.76	9.79	147	-3.80	< .001	0.63

Note. N = 200. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

4.2.1d Based on teachers' family structure

A small mean difference in intellectual humility (IH) was found between teachers from joint family and nuclear family. Shapiro-Wilk test of normality was conducted and found that IH is likely to have been produced by a normal distribution both in the joint family category (α = 05, W = 0.97, p = .086) and nuclear family category (α = .05, W = 0.99, p = .304). The result of Levene's test for IH was significant based on an

alpha value of .05, F (1, 198) = 0.21, p = .650 indicating that the variance of IH is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (198) = -.30, p = .762. This finding suggests that the mean of IH was not significantly higher in teachers from nuclear family compared to teachers from joint family.

Table 4.63
Two-tailed independent samples t-test for teachers' intellectual humility by family structure

	Joint Family			Nuclear Family					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	80.94	9.38	70	81.38	10.08	130	-0.30	.762	0.05

Note. N = 200. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

4.2.1e Based on teachers' marital status

It was found that intellectual humility (IH) was highest in teachers who preferred not to say his/her marital status and lowest in unmarried teachers. Following table presents marital status wise assessment score of intellectual humility.

Table 4.64
Mean, standard deviation and sample size for teachers' intellectual humility by marital status

Marital Status	*M*	*SD*	*n*
Unmarried	80.10	9.48	58
Married	81.65	10.01	138
Prefer Not to Say	83.00	8.76	4

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (2, 197) = 0.57, p = .566, indicating there were no significant differences in intellectual humility (IH) among the levels of marital status. The eta

squared was 0.01 indicating Marital status explains approximately 1% of the variance in IH.

Table 4.65
ANOVA table for teachers' intellectual humility by marital status

Term	*SS*	*df*	*F*	*p*	η_p^2
Marital status	110.74	2	0.57	.566	0.01
Residuals	19,080.68	197			

4.2.1f Based on nature of institute which the teachers were associated with

A small mean difference in intellectual humility (IH) was found between teachers at college and university. Shapiro-Wilk test of normality was conducted and found that IH is likely to have been produced by a normal distribution both in the college category (α = 05, W = 0.98, p = .127) and in the university category (α = .05, W = 0.97, p = .176). The result of Levene's test for IH was significant based on an alpha value of .05, F (1, 198) = 0.31, p = .579 indicating that the variance of IH is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (198) = 1.42, p < .001, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of IH was significantly higher in college teachers compared to university teachers.

Table 4.66
Two-tailed independent samples t-test for teachers' intellectual humility by nature of institute

	College			University					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	81.92	9.69	134	79.83	10.01	66	1.42	.159	0.21

Note. N = 200. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

4.1.1g Based on faculty which the teachers were associated with

It was found that intellectual humility (IH) was highest in teachers of science faculty and lowest in teachers of engineering & technology faculty. Following table presents faculty wise assessment score of intellectual humility.

Table 4.67
Mean, standard deviation and sample size for teachers' intellectual humility by faculty

Faculty	*M*	*SD*	*n*
Arts, Humanities and Social Sciences	81.03	10.23	119
Commerce, Law & Management	81.60	7.06	5
Engineering & Technology	80.29	9.11	14
Science	81.81	9.51	62

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 196) = 0.13, p = .941, indicating there were no significant differences in intellectual humility (IH) among the levels of faculty.

Table 4.68
ANOVA table for teachers' intellectual humility by faculty

Term	*SS*	*df*	*F*	*p*	η_p^2
Faculty	38.76	3	0.13	.941	0.00
Residuals	19,152.66	196			

4.2.1h Based on teachers' designation

It was found that intellectual humility (IH) was highest in assistant professors and lowest in part-time/guest/contractual teachers.

Table 4.69
Mean, standard deviation and sample size for teachers' intellectual humility by designation

Designation	*M*	*SD*	*n*
Part-time/Guest/Contractual Faculty	71.20	6.69	5
State Aided College Teacher	81.25	6.70	4
Assistant Professor	82.37	9.71	162
Associate Professor	75.17	4.83	6
Professor	76.96	10.04	23

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (4, 195) = 3.70, p = .006, indicating there were significant differences in intellectual humility among the designations. The eta squared was 0.07 indicating designation explains approximately 7% of the variance in intellectual humility.

Table 4.70
ANOVA table for teachers' intellectual humility by designation

Term	*SS*	*df*	*F*	*p*	η_p^2
Designation	1,354.30	4	3.70	.006	0.07
Residuals	17,837.12	195			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. No other significant effects were found.

4.2.1i Based on teachers' teaching experience

It was found that intellectual humility (IH) was highest in teachers having between 10 and 20 years of teaching experience and teachers having more than 20 years of teaching experience.

Table 4.71
Mean, standard deviation and sample size for teachers' intellectual humility by teaching experience

Teaching Experience	*M*	*SD*	*n*
Less Than 5 Years	80.26	9.75	68
Between 5 & 10 Years	81.99	9.37	83
Between 10 & 20 Years	83.39	10.66	31
More Than 20 Years	77.67	10.09	18

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 196) = 1.69, p = .171, indicating there were no significant differences in intellectual humility among the levels of teaching experience.

Table 4.72
ANOVA table for teachers' intellectual humility by teaching experience

Term	*SS*	*df*	*F*	*p*	η_p^2
Teaching Experience	483.84	3	1.69	.171	0.03
Residuals	18,707.58	196			

4.2.1j Based on teachers' highest educational qualification

It was found that intellectual humility (IH) was highest in teachers with post-doctoral level education and lowest in teachers who have studied up to master's degree.

Table 4.73
Mean, standard deviation and sample size for teachers' intellectual humility by highest educational qualification

Highest Educational Qualification	*M*	*SD*	*n*
Master's Degree	78.93	9.79	46
M.Phil.	81.51	9.10	35
PhD	81.56	10.34	93
Post-Doctoral Level	83.73	8.50	26

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 196) = 1.45, p = .228, indicating there were no significant differences in intellectual humility among the levels of highest educational qualification

Table 4.74
ANOVA table for teachers' intellectual humility by highest educational qualification

Term	*SS*	*df*	*F*	*p*	η_p^2
Highest Educational Qualification	417.83	3	1.45	.228	0.02
Residuals	18,773.59	196			

4.2.1k Based on teachers' reading preference

It was found that intellectual humility (IH) was highest in teachers who preferred fiction related books followed by non-fiction and other than mentioned.

Table 4.75
Mean, standard deviation and sample size for teachers' intellectual humility by reading preference

Reading Preference	*M*	*SD*	*n*
Fiction	82.00	9.99	97
Non-Fiction	81.55	9.40	69
Other Than mentioned	78.38	9.95	34

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (2, 197) = 1.78, p = .172, indicating there were no significant differences in intellectual humility among the levels of reading preference.

Table 4.76
ANOVA table for teachers' intellectual humility by reading preference

Term	*SS*	*df*	*F*	*p*	η_p^2
Reading Preference	340.32	2	1.78	.172	0.02
Residuals	18,851.10	197			

4.2.1l Based on teachers' frequency of newspaper reading

It was found that intellectual humility (IH) was highest in teachers who read newspaper regularly and lowest in students who almost do not read any form of daily newspaper.

Table 4.77
Mean, standard deviation and sample size for teachers' intellectual humility by newspaper reading

Frequency of Newspaper Reading	*M*	*SD*	*n*
Almost Never	72.40	13.20	10
Rarely	79.22	7.24	23
Sometimes When Not Occupied Otherwise	81.66	10.08	50
Regularly	82.20	9.52	117

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 196) = 3.56, p = .015, indicating there were significant differences in intellectual humility (IH) among the levels of frequency of newspaper reading. The eta squared was 0.05 indicating frequency of newspaper reading explains approximately 5% of the variance in IH.

Table 4.78
ANOVA table for teachers' intellectual humility by frequency of newspaper reading

Term	*SS*	*df*	*F*	*p*	η_p^2
Frequency of Newspaper Reading	991.41	3	3.56	.015	0.05
Residuals	18,200.01	196			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. For the main effect of frequency of newspaper reading, the mean of intellectual humility (IH) for teachers who almost never read newspaper (M = 72.40, SD = 13.20) were

significantly smaller than for 'sometimes when not occupied otherwise' category (M = 81.66, SD = 10.08) at p = .031 and for 'regularly' category (M = 82.20, SD = 9.52) at p = .001.

4.2.1m Based on teachers' social media engagement

It was found that intellectual humility (IH) was highest in teachers who spent less than an hour every day on social media and lowest in teachers who do not use any social media so far.

Table 4.79
Mean, standard deviation and sample size for teachers' intellectual humility by social media engagement

Social Media Engagement	*M*	*SD*	*n*
Do Not Have Social Media Account	75.60	10.01	5
Less Than 1 Hour	82.73	10.08	101
Between 1 & 4 Hours	80.56	9.46	84
More Than 4 Hours	74.50	6.00	10

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 196) = 3.13, p = .027, indicating there were significant differences in intellectual humility (IH) among the levels of social media engagement. The eta squared was 0.05 indicating social media engagement explains approximately 5% of the variance in IH.

Table 4.80
ANOVA table for teachers' intellectual humility by social media engagement

Term	*SS*	*df*	*F*	*p*	η_p^2
Social Media Engagement	877.24	3	3.13	.027	0.05
Residuals	18,314.18	196			

For Post-hoc, a t-test was calculated between each group combination to further examine the differences among the variables based on an alpha of .05. The Tukey HSD p-value adjustment was used to correct for the effect of multiple comparisons on the family-wise error rate. No other significant effects were found.

4.2.2 Openness in teachers

4.2.2a Based on teachers' gender

A negligible mean difference in openness (OP) was found between female and male teachers. Shapiro-Wilk test of normality was conducted and found that OP is likely to have been produced by a normal distribution both in the female category (α = 05, W = 0.98, p = .337) and in the male category (α = .05, W = 0.98, p = .136). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 198) = 0.79, p = .374 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (198) = 0.25, p = .804. This finding suggests that the mean of OP was not significantly higher in female than male teachers.

Table 4.81
Two-tailed independent samples t-test for teachers' openness by gender

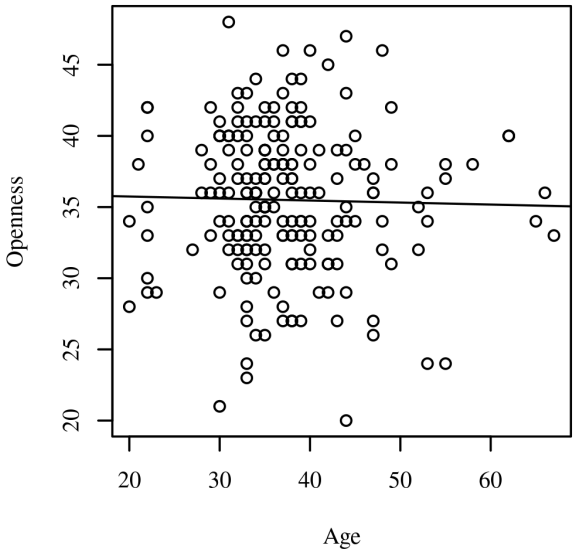
	Female			Male					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	35.60	5.24	83	35.42	5.07	117	0.25	.804	0.04

Note. N = 200. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

4.2.2b Based on teachers' age

A Pearson product moment correlation analysis was conducted between teachers' age and openness. Cohen's standard was used to evaluate the strength of the relationship. A scatterplot with regression line was made and found that the pair of variables is linear.

Figure 4.9
Scatterplot with the regression line added for teachers' age and openness



The result of the correlation was examined based on an alpha value of .05. There were no significant correlations found between the pair of variables.

Table 4.82
Correlation results between teachers' age and openness

Combination	*r*	95.00% CI	*n*	*p*
Age - Openness (Pearson)	-.02	[-.16, .12]	200	.751

4.2.2c Based on teachers' locality of residence

A negligible mean difference in openness (OP) was found between rural and urban teachers. Shapiro-Wilk test of normality was conducted and found that OP is likely to have been produced by a normal distribution both in the rural category (α = 05, W = 0.97, p = .241) and in the urban category (α = .05, W = 0.99, p = .308). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 198) = 1.54, p = .216 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (198) = -0.13, p = .895. This finding suggests that the mean of OP was not significantly lower in rural teachers than their urban counterparts.

Table 4.83
Two-tailed independent samples t-test for teachers' openness by locality of residence

	Rural			Urban					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	35.42	4.57	53	35.52	5.33	147	-0.13	.895	0.02

Note. N = 200. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

4.2.2d Based on family structure

A small mean difference in openness (OP) was found between teachers from joint family and nuclear family. Shapiro-Wilk test of normality was conducted and found that OP is likely to have been produced by a normal distribution both in the joint family category (α = 05, W = 0.97, p = .128) and in the nuclear family category (α = .05, W = 0.99, p = .401). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 878) = 0.75, p = .388 indicating that the variance of OP

is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was significant based on an alpha value of .05, t (198) = 1.40, p = .163, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of OP was not significantly higher in teachers from nuclear family compared to teachers from joint family.

Table 4.84
Two-tailed independent samples t-test for teachers' openness by family structure

	Joint Family			Nuclear Family					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	36.19	4.82	70	35.12	5.27	130	1.40	.163	0.21

Note. N = 880. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

4.2.2e Based on teachers' marital status

It was found that openness (OP) was highest in teachers who preferred not to say his/her marital status and lowest in married teachers.

Table 4.85
Mean, standard deviation and sample size for teachers' openness by marital status

Marital Status	*M*	*SD*	*n*
Unmarried	36.78	4.37	58
Married	34.91	5.32	138
Prefer Not to Say	37.00	6.16	4

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (2, 197) = 2.92, p = .056, indicating there were no significant differences in openness (OP) among the levels of marital status.

Table 4.86
ANOVA table for teachers' openness by marital status

Term	*SS*	*df*	*F*	*p*	η_p^2
Marital Status	150.95	2	2.92	.056	0.03
Residuals	5,087.04	197			

4.2.2f Based on nature of institute with which teachers are associated with

A negligible mean difference in openness (OP) was found between teachers at college and university. Shapiro-Wilk test of normality was conducted and found that OP is likely to have been produced by a normal distribution both in the college category (α = 05, W = 0.99, p = .186) and in the university category (α = .05, W = 0.99, p = .665). The result of Levene's test for OP was not significant based on an alpha value of .05, F (1, 198) = 0.20, p = .651 indicating that the variance of OP is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was not significant based on an alpha value of .05, t (198) = 1.16, p = .246, indicating the null hypothesis cannot be rejected. This finding suggests that the mean of OP was not significantly higher in college teachers compared to university teachers.

Table 4.87
Two-tailed independent samples t-test for teachers' openness by nature of institute

	College			University					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	35.79	5.01	134	34.89	5.36	66	1.16	.246	0.17

Note. N = 200. Degrees of Freedom for the *t*-statistic = 198. *d* represents Cohen's *d.*

4.2.2g Based on faculty with which teachers are associated with

It was found that openness (OP) was highest in teachers of arts, humanities and social Sciences and lowest in teachers of commerce, law and management faculty. Following table presents faculty wise assessment score of openness.

Table 4.88
Mean, standard deviation and sample size for openness by faculty

Faculty	*M*	*SD*	*n*
Arts, Humanities and Social Sciences	35.80	4.94	119
Commerce, Law & Management	30.20	4.66	5
Engineering & Technology	35.43	5.00	14
Science	35.35	5.43	62

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 196) = 1.96, p = .122, indicating there were no significant differences in openness (OP) among the faculty levels.

Table 4.89
ANOVA table for teachers' openness by faculty

Term	*SS*	*df*	*F*	*p*	η_p^2
Faculty	152.41	3	1.96	.122	0.03
Residuals	5,085.58	196			

4.2.2h Based on designation of teachers

It was found that openness (OP) was highest in state aided college teachers and lowest in part-time/guest/contractual teachers.

Table 4.90
Mean, standard deviation and sample size for openness by designation of teachers

Designation	*M*	*SD*	*n*
Part-time/Guest/Contractual Faculty	33.80	4.38	5
State Aided College Teacher	38.25	4.35	4
Assistant Professor	35.67	5.21	162
Associate Professor	35.00	5.33	6
Professor	34.30	4.79	23

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (4, 195) = 0.79, p = .533, indicating there were no significant differences in openness among teachers of different designations.

Table 4.91
ANOVA table for openness by designation of teachers

Term	*SS*	*df*	*F*	*p*	η_p^2
Designation	83.58	4	0.79	.533	0.02
Residuals	5,154.42	195			

4.2.2i Based on teaching experience

It was found that openness (OP) was highest in teachers with 10 – 20 years of teaching experience and lowest in teachers having teaching experience of more than 20 years.

Table 4.92
Mean, standard deviation and sample size for openness by teaching experience

Teaching Experience	*M*	*SD*	*n*
Less Than 5 Years	35.56	5.33	68
Between 5 & 10 Years	35.59	5.02	83
Between 10 & 20 Years	36.03	5.02	31
More Than 20 Years	33.89	5.18	18

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 196) = 0.71, p = .546, indicating there were no significant differences in openness among levels of teaching experience.

Table 4.93
ANOVA table for openness by teaching experience

Term	*SS*	*df*	*F*	*p*	η_p^2
Teaching Experience	56.41	3	0.71	.546	0.01
Residuals	5,181.58	196			

4.2.2j Based on highest educational qualification

It was found that openness (OP) was highest in teachers who have studied up to master's degree level and lowest in teachers having M.Phil. as their highest educational qualification.

Table 4.94
Mean, standard deviation and sample size for openness by teaching experience

Highest Educational Qualification	*M*	*SD*	*n*
Master's Degree	35.93	4.95	46
M.Phil.	35.29	5.06	35
PhD	35.41	5.18	93
Post-Doctoral Level	35.31	5.60	26

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 196) = 0.15, p = .929, indicating there were no significant differences in openness among levels of highest educational qualification.

Table 4.95
ANOVA table for openness by teachers' highest educational qualification

Term	*SS*	*df*	*F*	*p*	η_p^2
Highest Educational Qualification	12.04	3	0.15	.929	0.00
Residuals	5,225.96	196			

4.2.2k Based on reading preference

It was found that openness (OP) was highest in teachers who preferred fiction related readings and lowest in teachers who preferred non-fictions.

Table 4.96
Mean, standard deviation and sample size for teachers' openness by reading preference

Reading Preference	*M*	*SD*	*n*
Fiction	35.75	4.99	97
Non-Fiction	35.09	5.38	69
Other Than mentioned	35.59	5.11	34

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (2, 197) = 0.34, p = .709, indicating there were no significant differences in openness among levels of reading preference.

Table 4.97
ANOVA table for openness by teachers' highest educational qualification

Term	*SS*	*df*	*F*	*p*	η_p^2
Highest Educational Qualification	12.04	3	0.15	.929	0.00
Residuals	5,225.96	196			

4.2.2l Based on teachers' frequency of newspaper reading

It was found that openness (OP) was highest in teachers who read newspaper sometimes when not occupied otherwise and lowest in teachers who rarely read any form of daily newspaper.

Table 4.98
Mean, standard deviation and sample size for openness by newspaper reading

Frequency of Newspaper Reading	*M*	*SD*	*n*
Almost Never	36.30	5.50	10
Rarely	34.26	4.93	23
Sometimes When Not Occupied Otherwise	36.56	4.87	50
Regularly	35.21	5.22	117

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were significant, F (3, 196) = 1.37, p = .254, indicating there were no significant differences in openness (OP) among the levels of frequency of newspaper reading.

Table 4.99
ANOVA table for openness by teachers' frequency of newspaper reading

Term	*SS*	*df*	*F*	*p*	η_p^2
Frequency of Newspaper Reading	107.48	3	1.37	.254	0.02
Residuals	5,130.51	196			

4.2.2m Based on teachers' social media engagement

It was found that openness (OP) was highest in teachers who spent around 1 to 4 hours every day on social media and lowest in teachers who do not use any social media so far.

Table 4.100
Mean, standard deviation and sample size for teachers' openness by social media engagement

Social Media Engagement	*M*	*SD*	*n*
Do Not Have Social Media Account	33.00	6.16	5
Less Than 1 Hour	35.45	5.37	101
Between 1 & 4 Hours	35.70	4.89	84
More Than 4 Hours	35.50	4.45	10

An ANOVA was examined based on an alpha value of .05. The results of the ANOVA were not significant, F (3, 196) = 0.44, p = .725, indicating there were no significant differences in openness (OP) among the levels of social media engagement.

Table 4.101
ANOVA table for teachers' openness by social media engagement

Term	*SS*	*df*	*F*	*p*	η_p^2
Social Media Engagement	34.98	3	0.44	.725	0.01
Residuals	5,203.01	196			

4.2.3 Comparison and relationship: Teachers' intellectual humility and openness

This section represents detailed comparison between descriptive statistics on teachers' intellectual humility and openness in terms of three category of explanatory variables i.e., socio-demographic, academic and behavioural variables. Latter part of

this section has highlighted the relationship between teachers' intellectual humility and openness along with moderating effects of explanatory variables on the relationship.

4.2.3a Comparison of based on socio-demographic variables

Table 4.102
Descriptive statistics comparing teachers' intellectual humility and openness by socio-demographic variables

Variable	*Levels*	*Sample size*	*Intellectual humility Mean (SD)*	*Openness Mean (SD)*
Gender	Female	83	81.10 (9.83)	35.60 (5.24)
	Male	117	81.32 (9.86)	35.42 (5.07)
Age	20 - 67	200	r = .07, .10	r = - .02
Locality of residence	Rural	53	76.98 (8.66)	35.42 (4.57)
	Urban	147	82.76 (9.79)	35.52 (5.33)
Family structure	Joint family	70	80.94 (9.38)	36.19 (4.82)
	Nuclear family	130	81.38 (10.08)	35.12 (5.27)
Marital status	Unmarried	58	80.10 (9.48)	36.78 (4.37)
	Married	138	81.65 (10.01)	34.91 (5.32)
	Prefer Not to Say	4	83 (8.76)	37 (6.16)

It was found that intellectual humility was higher in male teachers, but openness was lower than female teachers. With increasing age, openness slightly decreased but intellectual humility increased among teachers. Urban teachers were more open and intellectually humble than teachers who lived in rural areas. Teachers from nuclear family were more intellectually humble but less open than teacher living in joint families.

4.2.3b Comparison based on academic variables

Table 4.103
Descriptive statistics comparing teachers' intellectual humility and openness by academic variables

Variable	*Levels*	*Sample size*	*Intellectual humility Mean (SD)*	*Openness Mean (SD)*
Nature of institute	College	134	81.92 (9.69)	35.79 (5.01)
	University	66	79.83 (10.01)	34.89 (5.36)
Faculty	Arts, Humanities and Social Sciences	119	81.03 (10.23)	35.80 (4.94)
	Commerce, Law & Management	5	81.60 (7.06)	30.20 (4.66)
	Engineering & Technology	14	80.29 (9.11)	35.43 (5.00)
	Science	62	81.81 (9.51)	35.35 (5.43)
Designation	Part-time/Guest/Contractual Faculty	5	71.20 (6.69)	33.80 (4.38)
	State Aided College Teacher	4	81.25 (6.70)	38.25 (4.35)
	Assistant Professor	162	82.37 (9.71)	35.67 (5.21)
	Associate Professor	6	75.17 (4.83)	35 (5.21)
	Professor	23	76.96 (10.04)	34.30 (4.79)
Teaching Experience	Less Than 5 Years	68	80.26 (9.75)	35.56 (5.33)
	Between 5 & 10 Years	83	81.99 (9.37)	35.59 (5.02)
	Between 10 & 20 Years	31	83.39 (10.66)	36.03 (5.02)
	More Than 20 Years	18	77.67 (10.09)	33.89 (5.18)
Highest Educational Qualification	Master's Degree	46	78.93 (9.79)	35.93 (4.95)
	M.Phil.	35	81.51 (9.10)	35.29 (5.06)
	PhD	93	81.56 (10.34)	35.41 (5.18)
	Post-Doctoral Level	26	83.73 (8.50)	35.31 (5.60)

Teachers at colleges, from science faculty, have designation of assistant professor, been teaching between 10 to 20 years and having education up to post-doctoral level

were found to be more intellectually humble than their other groups of each variable. State aided college teachers from Arts, humanities and social science faculty, having teaching experience between 10 to 20 years and studied up to master's degree were found to have more openness than other levels of respective categories.

4.2.3c Comparison based on behavioural variables

Table 4.104
Descriptive statistics comparing teachers' intellectual humility and openness by behavioural variables

Variable	*Levels*	*Sample size*	*Intellectual humility Mean (SD)*	*Openness Mean (SD)*
Reading preference	Fiction	97	82 (9.99)	35.75 (4.99)
	Non-fiction	69	81.55 (9.40)	35.09 (5.38)
	Other Than mentioned	34	78.38 (9.95)	35.59 (5.11)
Frequency of newspaper reading	Almost never	10	72.40 (13.20)	36.30 (5.50)
	Rarely	23	79.22 (7.24)	34.26 (4.93)
	Sometimes When Not Occupied Otherwise	50	81.66 (10.08)	36.56 (4.87)
	Regularly	117	82.20 (9.52)	35.21 (5.22)
Social media engagement	Do not have social media account	5	75.60 (10.01)	33 (6.16)
	Less than 1 hour	101	82.73 (10.08)	35.45 (5.37)
	Between 1 & 4 hours	84	80.56 (9.46)	35.70 (4.89)
	More than 4 hours	10	74.50 (6.00)	35.50 (4.45)

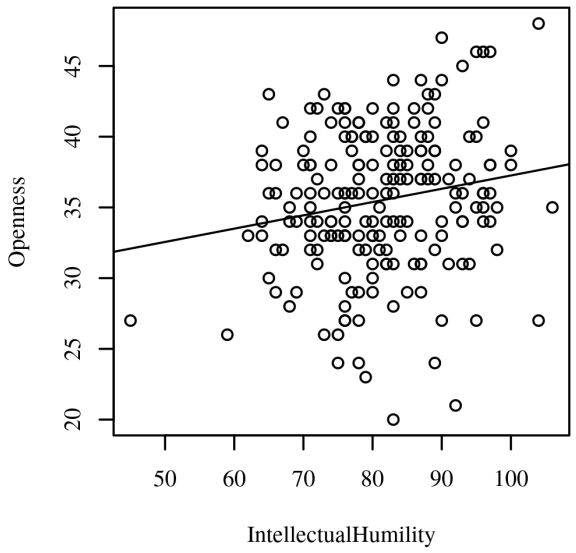
Both intellectual humility and openness were higher in teachers who preferred reading fiction-related books and having habits of reading newspaper often when not occupied otherwise than their counterparts. In terms of social media engagement, it was found that teachers who has engagement of less than 1 hour daily were more intellectually

humble but teachers who uses social media more (between 1 & 4 hours) had more openness.

4.2.3d Correlation between intellectual humility and openness

A Pearson product moment correlation analysis was conducted between intellectual humility and openness of teachers. Cohen's standard was used to evaluate the strength of the relationship. A scatterplot with regression line was made and found that the pair of variables is linear.

Figure 4.10
Scatterplot with the regression line added for teachers' intellectual humility and openness



The result of the correlation was examined based on an alpha value of .05. A non-significant positive correlation was observed between intellectual humility (IH) and openness (OP), with a correlation of .18, indicating a small effect size (p = .065, 95.00% CI = [.04, .31]). It suggests that as intellectual humility increases, openness tends to increase among teachers.

Table 4.105
Correlation results between teachers' intellectual humility and openness

Combination	*r*	95.00% CI	*n*	*p*
Intellectual humility - Openness	.18	[.04, .31]	200	.065

Further, four separate Pearson correlation analysis were computed taking the sub-scales of intellectual humility i.e., Independence of Intellect and Ego (IIE), Openness to Revising One's Viewpoint (OROV), Respect for Others' Viewpoints (ROV) and Lack of Intellectual Overconfidence (LIO) individually with openness (OP) to see effect size of particular factors of intellectual humility in the association with openness. Four scatterplots were made for each pair of association followed by the effect size in the Table 4.106.

Figure 4.11
Scatterplots with the regression line added for factors of intellectual humility and openness of teachers

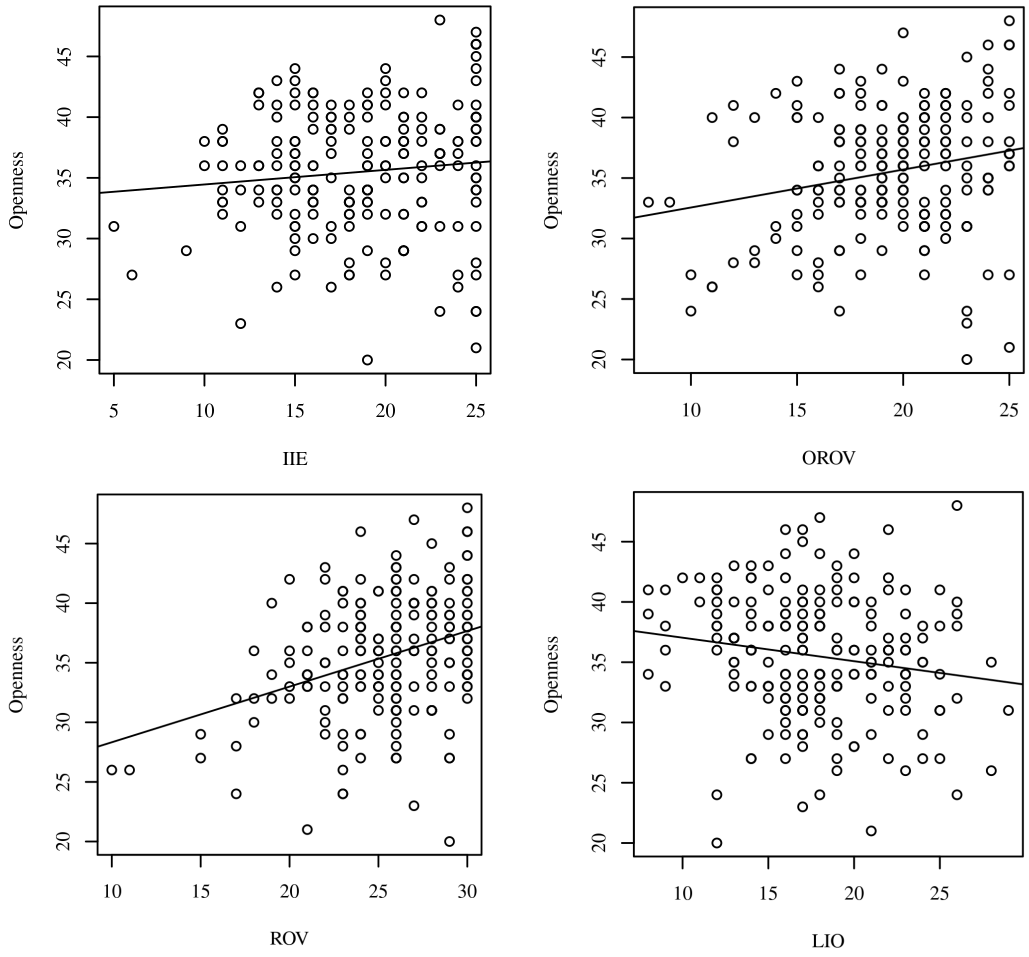


Table 4.106
Correlation results between factors of intellectual humility and openness of teachers

Combination	*r*	95.00% CI	*n*	*p*
IIE - Openness	.10	[-.04, .24]	200	.574
OROV - Openness	.22	[.08, .34]	200	.018
ROV - Openness	.34	[.21, .46]	200	< .001
LIO - Openness	-.16	[-.30, -.03]	200	.101

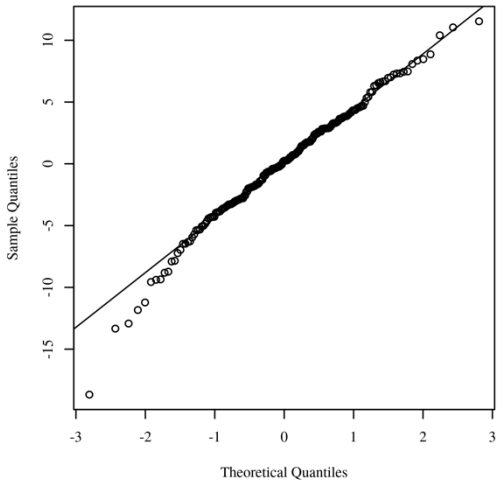
A significant positive correlation was observed between ROV and openness, with a correlation of 0.34, indicating a moderate effect size ($p < .001$, 95.00% CI = [-.21, -.46]). This suggests that as IIE increases, openness tends to decrease. A significant positive correlation was observed between OROV and openness, with a correlation of .22, indicating a small effect size ($p = .018$, 95.00% CI = [.08, .34]). This suggests that as OROV increases, openness tends to increase.

4.2.3e Intellectual humility predicting openness in teachers

As it was seen earlier that individual effect size varied for the association of each pair of factors of intellectual humility and openness, a linear regression analysis was computed to assess whether Independence of Intellect and Ego (IIE), Openness to Revising One's Viewpoint (OROV), Respect for Others' Viewpoints (ROV) and Lack of Intellectual Overconfidence (LIO) significantly predicted Openness (OH) of teachers. The assumption of normality was assessed plotting the quantiles of the model residuals against the quantiles of a Chi-square distribution (Q-Q scatterplot) where it

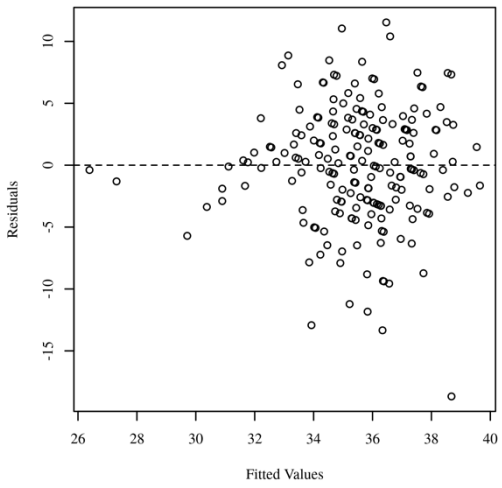
was seen that no strong deviation of quantiles of the residuals were there from the theoretical quantiles indicating the reliability of the parameter estimates.

Figure 4.12
Q-Q scatterplot for normality of the residuals for the regression model (IIE, OROV,



Homoscedasticity was evaluated by plotting the residuals against the predicted values (Bates et al., 2014; Field, 2017; Osborne & Walters, 2002). The assumption of homoscedasticity is met as the points appear randomly distributed with a mean of zero and no apparent curvature as seen in Figure 4.13.

Figure 4.13
Residuals scatterplot testing homoscedasticity (IIE, OROV, ROV, ILO & OP)



Variance Inflation Factors (VIFs) were calculated to detect the presence of multicollinearity between predictors and found that the VIFs for all the factors of intellectual humility are below 5 indicating negligible presence of multicollinearity.

Table 4.107
Variance Inflation Factors for teachers' IIE, OROV, ROV, and LIO

Factors of intellectual humility (Variable)	VIF
IIE	1.14
OROV	1.25
ROV	1.34
LIO	1.05

The results of the linear regression model were significant, $F(4,195) = 8.75$, $p < .001$, $R^2 = .15$, indicating that approximately 15% of the variance in openness (OP) is explainable by IIE, OROV, ROV, and LIO. ROV significantly predicted openness, $B = 0.42$, $t(195) = 3.96$, $p < .001$. This indicates that on average, a one-unit increase of ROV will increase the value of openness by 0.37 units. LIO significantly predicted openness, $B = -0.22$, $t(195) = -2.72$, $p = .007$ indicating on average, a one-unit increase of LIO will decrease the value of openness by 0.22 units. Table 4.108 summarizes the results of the regression model.

Table 4.108
Results for Linear Regression with IIE, OROV, ROV, and LIO predicting Openness of teachers

Variable	*B*	*SE*	95.00% CI	β	*t*	*p*
(Intercept)	25.86	2.92	[20.09, 31.62]	0.00	8.85	< .001
IIE	0.06	0.08	[-0.10, 0.22]	0.05	0.73	.468
OROV	0.10	0.11	[-0.11, 0.31]	0.07	0.90	.368
ROV	0.42	0.11	[0.21, 0.62]	0.30	3.96	< .001
LIO	-0.22	0.08	[-0.38, -0.06]	-0.18	-2.72	.007

Note. Results: $F(4,195) = 8.75$, $p < .001$, $R^2 = .15$
Unstandardized Regression Equation: Openness = 25.86 + 0.06*IIE + 0.10*OROV + 0.42*ROV – 0.22*LIO

4.3 Comparison between students and teachers

Detailed comparisons were made between students and teachers in higher education regarding their intellectual humility and openness to capture a glimpse of the qualities among major stakeholders of higher education i.e., students and teachers. Therefore, in the present study, among many stakeholders of higher education i.e., students, teachers, parents, alumni, employees of educational institution, academic leaders, administrators, only two categories were covered. Therefore, in the below section, teachers and students were assumed as two levels of the 'stakeholder category' indicator and mentioned accordingly.

4.3.1 Intellectual humility based on stakeholder category

A large mean difference in intellectual humility (IH) was found between students and teachers. Shapiro-Wilk test of normality was conducted and found that IH is unlikely to have been produced by a normal distribution in the student category (α = 05, W = 0.98, $p < .001$) but likely in the teacher category (α = .05, W = 0.99, p = .208). The result of Levene's test for IH was not significant based on an alpha value of .05, F (1, 1078) = .02, p = .896 indicating that the variance of IH is equal for each category of the variable. The result of the two-tailed independent samples Student's t-test was significant based on an alpha value of .05, t (1078) = -8.32, $p <.001$ indicating the null hypothesis can be rejected. This finding suggests that the mean of IH was significantly higher in teachers than in students. Further, students and teachers were compared by the subscales of intellectual humility where it was seen that in three out of four subscales teachers were significant in better position than students.

Table 4.109
Two-tailed independent samples t-test for intellectual humility by stakeholder category

Variable	Student			Teacher					
	M	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Intellectual Humility	74.76	9.95	880	81.23	9.82	200	-8.32	< .001	0.65
Subscale: IIE	16.15	4.99	880	18.64	4.43	200	-6.99	< .001	0.53
Subscale: OROV	18.23	4.39	880	19.35	3.52	200	-3.87	< .001	0.28
Subscale: ROV	22.98	5.33	880	25.35	3.72	200	-7.44	< .001	0.52
Subscale: LIO	17.39	4.85	880	17.89	4.32	200	-1.33	.183	0.11

Note. N = 1080. Degrees of Freedom for the *t*-statistic = 1078. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was followed and found that the distribution of IH for students was significantly different (α = .05, U = 54965.5, z = -8.30, p < .001) from the distribution of IH for teachers. The median for teachers (Mdn = 80.50) was significantly higher than the median for students (Mdn = 73.00).

Table 4.110
Two-tailed Mann-Whitney U test for intellectual humility by stakeholder category

Variable	Student		Teacher				
	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Intellectual Humility	502.96	880	705.67	200	54,965.50	-8.30	< .001
Subscale: IIE	511.81	880	666.72	200	62,757.00	-6.35	< .001
Subscale: OROV	525.96	880	604.48	200	75,203.50	-3.22	.001
Subscale: ROV	514.42	880	655.24	200	65,053.00	-5.78	< .001
Subscale: LIO	534.73	880	565.88	200	82,923.50	-1.28	.201

4.3.2 Openness based on stakeholder category

A small mean difference in openness (OP) was found between students and teachers. Shapiro-Wilk test of normality was conducted and found that OP is unlikely to have been produced by a normal distribution in the student category (α = 05, W = 0.98, p < .001) but likely in the teacher category (α = .05, W = 0.99, p = .135). The result of Levene's test for OP was significant based on an alpha value of .05, F (1, 1078) = 8.37, p = .004 indicating that the variance of IH is not equal for each category of the variable. The result of the two-tailed independent samples Welch's t-test was significant based on an alpha value of .05, t (343.61) = -2.23, p = .026 indicating the null hypothesis can be rejected. This finding suggests that the mean of OP was significantly higher in teachers than in students.

Table 4.111
Two-tailed independent samples t-test for openness by stakeholder category

	Student			Teacher					
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*p*	*d*
Openness	34.56	6.18	880	35.49	5.13	200	-2.23	.026	0.16

Note. N = 1080. Degrees of Freedom for the *t*-statistic = 343.61. *d* represents Cohen's *d.*

As the assumptions of normality was violated, a two-tailed Mann-Whitney U test was followed and found that the distribution of OP for students was not significantly different (α = .05, U = U = 81603, z = -1.61, p = .108) from the distribution of OP for teachers. The median for teachers (Mdn = 36.00) was not significantly higher than the median for students (Mdn = 35.00).

Table 4.112
Two-tailed Mann-Whitney U test for openness by stakeholder category

	Student		Teacher				
Variable	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Openness	533.23	880	572.49	200	81,603.00	-1.61	.108

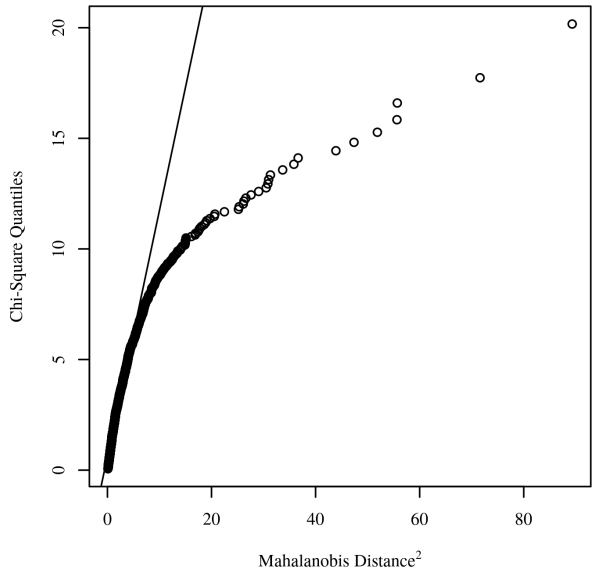
4.4 Further analysis

A path analysis model was conducted to determine whether the model of regressions accurately describe the data. Maximum likelihood estimation was performed to determine the standard errors for the parameter estimates.

Assumptions

Multivariate normality. To assess the assumption of multivariate normality, the squared Mahalanobis distances were calculated for the data and plotted against the quantiles of a Chi-square distribution (DeCarlo, 1997; Field, 2017). In the scatterplot, the solid line represents the theoretical quantiles of a normal distribution. Normality can be assumed if the points form a relatively straight line. The scatterplot for normality is presented in Figure 4.14.

Figure 4.14
Mahalanobis distance scatterplot testing multivariate normality



Multivariate Outliers. Influential points were identified in the data by calculating Mahalanobis distances and comparing them with the quantiles of a χ^2 distribution (Newton & Rudestam, 2012). An outlier was defined as any Mahalanobis distance that exceeds 18.47, the .999 quantile of a χ^2 distribution with 4 degrees of freedom (Kline, 2015). There were 28 observations detected as outliers.

Multicollinearity. Although variables should be correlated with one another to be considered suitable for factorization, variables that are too highly correlated can cause problems in path analysis. To assess multicollinearity, the squared multiple correlations were inspected and the determinant of the correlation matrix was calculated. Any variable with an $R^2 > .90$ can contribute to multicollinearity in the path analysis model (Kline, 2015). Variables that exhibit high multicollinearity should either be removed from the analysis or combined as a composite variable. There were no variables that had an $R^2 > .90$. Another assessment for multicollinearity is to assess the determinant of the data's correlation matrix. A determinant that is ≤ 0.00001

indicates that multicollinearity exists in the data (Field, 2017). The value of the determinant for the correlation matrix was 0.76, indicating that there was no multicollinearity in the data.

Results

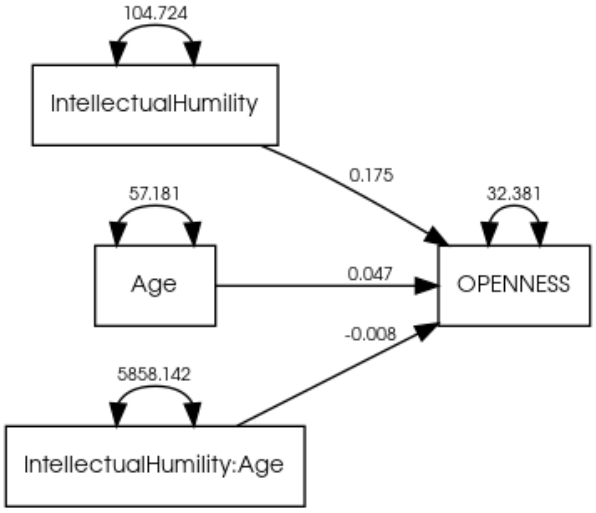
First, the reliability of the analysis was tested based on the sample size used to construct the model. Next, the results were evaluated using the Chi-square goodness of fit test and fit indices. Lastly, the squared multiple correlations (R^2) for each endogenous variable were examined. The results of the path analysis model are presented in Table 4.113. The node diagram is shown in Figure 4.15.

Table 4.113
Unstandardized Loadings (Standard Errors), Standardized Loadings, and Significance Levels for Each Parameter in the path analysis Model (N = 1080)

Parameter Estimate	Unstandardized	Standardized	*p*
Regressions			
Intellectual Humility → Openness	0.18(0.02)	0.30	< .001
Age → Openness	0.05(0.02)	0.06	.038
Intellectual Humility: Age → Openness	-0.008(0.002)	-0.10	< .001
Errors			
Error in Intellectual Humility: Age	5,858.14(252.09)	1.00	< .001
Error in Age	57.18(2.46)	1.00	< .001
Error in Intellectual Humility	104.72(4.51)	1.00	< .001
Error in Openness	32.38(1.39)	0.90	< .001

Note. $\chi^2(3) = 172.07$, $p < .001$

Figure 4.15
Node diagram for the path analysis model



Evaluating sample size. Factor analysis requires a large sample size to construct repeatable and reliable factors. A variety of authors suggest different benchmarks to determine sufficient sample size for path analysis. Some authors use benchmarks based on overall sample size. A common rule of thumb for determining sufficient sample size is 300 observations (Tabachnick & Fidell, 2013; Comrey & Lee, 2013). Other authors use the ratio (*N:q*) of overall sample size to the number of free parameter estimates (latent variable, indicator, variance, covariance or any regression estimates) included in the model. Kline (2015) recommends that the *N:q* ratio should be about 20 to 1. Schreiber et al. (2006) suggest that the consensus for a sufficient *N:q* ratio is 10:1. On the lower end of the ratio, Bentler and Chou (1987) suggest that an acceptable *N:q* ratio is 5:1. The participant to item ratio for this analysis was approximately 154 to 1, where sample size was 1080 and the number of variables included was 7. According to the *N:q* ratio rule-of-thumb, the given sample size is sufficient to produce reliable results.

Model fit. There are a variety of ways to measure if the path analysis model adequately describes the data. The Chi-square statistic is the most popular statistic used to measure model fit. Besides the Chi-square statistic, fit indices are also used to help researchers determine if the factor analysis model fits the data properly. Along with the Chi-square goodness of fit test, the following fit indices were used to assess the model fit: root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis index (TLI) and standardized root mean square residual (SRMR).

Fit indices. The TLI was less than .95, TLI = -0.19, which is indicative of a poor model fit (Hooper et al., 2008). The CFI was less than .90, CFI = 0.40, suggesting that the model is indicative of a poor model fit (Hooper et al., 2008). The RMSEA index was greater than .10, RMSEA = 0.23, 90% CI = [0.20, 0.26], which is indicative of a poor model fit (Hooper et al., 2008). The SRMR was greater than .08, SRMR = 0.13, which implies that the model fits the data poorly (Hooper et al., 2008). The fit indices are presented in Table 2.

Goodness of fit test. A Chi-square goodness of fit test was conducted to determine if the path analysis model fits the data adequately. It is standard practice for path analysis to include the Chi-square test. However, this test is sensitive to sample size, which causes the test to almost always reject the null hypothesis and indicate a poor model fit when the sample size is large (Hooper et al., 2008). The results of the Chi-square goodness of fit test were significant, $\chi^2(3) = 172.07$, $p < .001$, suggesting that the model did not adequately fit the data.

Table 4.114
Fit Indices for the path analysis model

NFI	TLI	CFI	RMSEA	SRMR
0.41	-0.19	0.40	0.23	0.13

Note. RMSEA 90% CI = [0.20, 0.26]

Squared multiple correlations. The regressions in the model can be assessed by examining the R^2 value of each endogenous variable. The R^2 value identifies how much the endogenous variable is explained by the regressions in the model. An R^2 value ≤ .20 suggests the endogenous variable is not adequately explained by the regression(s) in the model and all regressions for that endogenous variable should be considered for removal from the model (Hooper et al., 2008). The following endogenous variables had R^2 values ≤ .20: Openness. The R^2 values, along with the error variances for each endogenous variable are presented in Table 4.115.

Table 4.115
Estimated Error Variances and R^2 Values for Each Endogenous Variable in the SEM model

Endogenous Variable	Standard Error	R^2
Openness	32.38	.10

Interpretations for regressions. The regressions were examined based on an alpha value of .05. Intellectual humility significantly predicted Openness, B = 0.18, z = 10.34, p < .001, indicating a one-unit increase in Intellectual humility will increase the expected value of Openness by 0.18 units. Age significantly predicted Openness, B = 0.05, z = 2.07, p = .038, indicating a one-unit increase in Age will increase the expected value of Openness by 0.05 units.

Moderating Effects. Moderation was evaluated by looking at the significance of the interaction term using an alpha of .05. Each interaction was created by taking the product of the mean-centered values, since the variables were observed and not latent constructs. Age significantly moderated the effect Intellectual humility had on Openness, $B = -0.008$, $z = -3.56$, $p < .001$. This indicates that on average, a one-unit increase in Age will cause a 0.008 decrease in the slope of Openness on Intellectual humility.

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CHAPTER 5

DISCUSSION

Chapter 5 Discussion

This chapter summarizes the significant findings on intellectual humility and openness of teachers and students concerning different socio-demographic, academic and behavioural variables, followed by addressing the research questions as conclusions. Detail discussion of the results is presented in the latter part of this chapter, including scopes of further studies in this area.

5.1 Summary of major findings

5.1.1 Study 1

a. Male and female students varied in terms of intellectual humility and the differences are due to random chances. But openness was significantly higher in male students.
b. Age was found to have a moderate positive correlation with intellectual humility and openness, which is statistically significant for students.
c. Students who are first born child of their parents were found to have significantly more intellectual humility and openness than their siblings.
d. Urban area students were more intellectually humble and significantly more open, as found in this study.
e. Student participants from nuclear families possessed more intellectual humility and openness, which is also statistically significant.
f. Intellectual humility and openness of students did not significantly differ because of their marital status.

g. University students were significantly more intellectually humble and open than college students.

h. Science faculty students were more intellectually humble but students from commerce, law and management were significantly more open than students from other disciplines or faculties.

i. Intellectual humility and openness were significantly high in students pursuing research degrees.

j. Reading preference of students did not cause any variation in their intellectual humility and openness.

k. Intellectual humility was highest among students who read daily newspapers (of any form) occasionally but who read on daily basis were significantly more open.

l. A moderate use of social media was found to have resulted in a higher level of intellectual humility but their openness was not significantly influenced.

m. A-category and metropolitan university (Jadavpur University, Presidency University as selected based on criteria) students were significantly more intellectually humble and open than B-category university students (Kazi Nazrul University and Raiganj University as selected based on criteria; please refer to section 4.1.3d).

n. Intellectual humility and openness were positively correlated with a moderate effect size which was statistically significant.

o. Components of intellectual humility in students predicted 47.38% of the variance in their openness.

5.1.2 Study 2

a. Male and female teachers did not significantly differ in their intellectual humility and openness.
b. Age of teachers was positively correlated with their intellectual humility but openness was negatively associated with a very low effect size.
c. Teachers living in urban areas were significantly more intellectually humble but not significantly more open than those in rural areas.
d. Family structure was found not to have resulted in variation of intellectual humility and openness in teachers.
e. Intellectual humility and openness of teachers had no remarkable variation when viewed in terms of their marital status.
f. College teachers were more intellectually humble and open than university teachers but the differences were due to random chance.
g. Although science faculty teachers were higher in intellectual humility and arts, humaties and social sciences teachers were more open than teachers from other disciplines but the variation was not statistically significant.
h. Designation or seniority of teachers did not have resulted in variation of their intellectual humility and openness.
i. Teachers with teaching experience between ten and twenty years were found have higher intellectual humility and openness but the difference was not statistically significant.
j. Teachers with post-doctoral level as their highest qualification were found have higher intellectual humility and lower openness, but the difference was not statistically significant.

k. Reading preference of teachers did not cause any variation in their intellectual humility and openness.

l. Intellectual humility was highest among teachers who read daily newspapers (of any form) every day but who read occasionally were more open.

m. Less use of social media was found to have resulted in a higher level of intellectual humility in teachers but their openness was not significantly influenced.

n. Intellectual humility and openness were positively correlated in teachers with small effect size which was statistically significant.

o. Components of intellectual humility in teachers predicted 15% of the variance in their openness.

5.1.3 Combined findings

a. Intellectual humility along with its three subscales namely Independence of Intellect and Ego (IIE), Openness to Revising Own's Viewpoint (OROV) and Respecting Others' Viewpoints (ROV) were moderate in both students and teachers but significantly higher in teachers compared to the student participants in this study. Both students and teachers were similar in terms of Lack of Intellectual Overconfidence (LIO) i.e., the fourth subscale of intellectual humility.

b. Openness was not so high among students and teachers but the teacher participants demonstrated a higher level of openness than the student participants and the difference was statistically significant.

c. Age of participants combining both studies (N=1080) significantly moderated the effect of intellectual humility had on openness which indicated that a one-unit increase in Age will cause a 0.008 decrease in the slope of Openness on Intellectual humility.

5.2 Summary of hypotheses/sub-hypotheses rejected

The previously formulated hypotheses in chapter 2 were divided into sub-hypotheses to show the differences found in the actual level. For better comprehension, the sub-hypotheses were written with subscribed level as follows –

a. $_{IH/S}$: Intellectual humility of students

b. $_{IH/T}$: Intellectual humility of teachers

c. $_{OP/S}$: Openness of students

d. $_{OP/T}$: Openness of teachers

e. $_{IH,OP/S}$: Intellectual humility and Openness of students

f. $_{IH,OP/T}$: Intellectual humility and Openness of teachers

Table 5.1
Summary of hypotheses / sub-hypotheses rejected

Sl.	*Hypothesis No.*	*Statement*
1	$H_0 1_{OP/S}$	Gender differences do not significantly result in variation of openness in students.
2	$H_0 15_{IH/S}$	Age is not significantly correlated with intellectual humility in students.
3	$H_0 2$	Birth order of students have no significant role in differing their intellectual humility and openness.
4	$H_0 3$	Intellectual humility and openness do not significantly vary with participants' locality of residence.
5	$H_0 4_{IH,OP/S}$	Family structure of students have no significant role in varying their intellectual humility and openness.

6	$H_0 6_{IH,OP/S}$	Intellectual humility and openness do not significantly vary with students' nature of the institute.
7	$H_0 8$	Intellectual humility and openness do not significantly vary with students' course level.
8	$H_0 13$	Intellectual humility and openness do not significantly vary with participants' habit of newspaper reading.
9	$H_0 14$	Intellectual humility and openness do not significantly vary with participants' social media engagement.
10	$H_0 7_{IH,OP/T}$	Intellectual humility and openness do not significantly vary with teachers' faculty.
11	$H_0 17$	Participants' Intellectual humility does not predict their openness.

5.3 Discussion

Considering the increasing importance of intellectual humility in almost all the domains of cognitive behaviours, the present study aimed to assess the same and its relation to the openness of students and teachers of higher education in West Bengal. The study also purported to find out variations of intellectual humility and openness among the students and teachers with respect to their personal, social, academic and behavioural characteristics. Statistical analyses of data from 1080 participants, the study explored interesting facts and variations which the researcher attempted to interpret and discuss through his worldviews and perspectives. Some results of the present study were aligned with other empirical studies and also contrasted in some cases.

A statistically significant gender gap was discovered when comparing students' levels of intellectual humility. Despite the dearth of studies examining the possible gender differences in intellectual humility, it appears that there may be such disparities. Some research has shown, for instance, that women typically outperform

males on tests of intellectual modesty, albeit by a narrow margin (Syzmanowicz & Furnham, 2011). However, some research has either not discovered any differences between the sexes in intellectual modesty or have found that the differences are inconsistent and dependent on the context and measure employed (Reilly et al., 2022). While gender does play a role in intellectual humility, other factors, such as culture (Colombo et al., 2021), education, and personal experience (Porter, 2015) are also significant. Furthermore, gender is a complex and multi-faceted construct, and cultural and contextual differences in gender disparities in intellectual humility may exist. It's safe to say that any disparities in intellectual humility between the sexes are probably quite minor and situational. The effect of gender on intellectual humility and the ways in which it interacts with other aspects needs more study.

Having more life experience and thus a broader worldview is clearly a benefit of becoming older. Individuals have the chance to broaden their horizons, meet more people, and face new problems and opportunities as they grow older. Their worldviews and awareness of the world as a whole can be enriched by these encounters. A person who has lived and travelled in a number of different nations may see the world differently and value cultural differences more highly than someone who has only seen life in one country. Mumford et al. (2022) contrasted the idea that a person who has been through adversity and emerged stronger may view life with greater optimism and vigour than someone who has had it easy, which is quite seen across cultures. It's crucial to remember that getting older doesn't automatically mean expanding one's worldview and growing up (Priyadarshini et al., 2014). It's possible that certain people, no matter how old they are or how much life experience they've had, will

always be stubbornly closed-minded and Further, having experiences isn't enough; one must also reflect on and incorporate those experiences into their view of the world in order to grow a more nuanced perspective. Therefore, having greater life experience and a higher level of maturity are not guaranteed by either. One must actively seek out fresh information and viewpoints, and then consider how those encounters altered one's worldview.

Learning to take on new roles and develop a sense of responsibility enhances one's ability to see things from different angles. One's aptitude for perspective-taking can be honed by cultivating a sense of responsibility and participating in role-playing exercises. The ability to put oneself in another person's shoes and gain insight into their emotions, viewpoints, and life experiences is called perspective-taking. Empathy and understanding in interpersonal relationships benefit greatly from this social and emotional intelligence facet (Ioannidou & Konstantikaki, 2008). In making judgments that will have an effect on others, having a strong sense of responsibility might help motivate you to think about how your choice will affect those you care about. A parent or leader with a strong sense of responsibility, for instance, could be more likely to weigh the opinions of individuals they are tasked with guiding and making decisions for, in order to do what's best for them. Perspective-taking can also be cultivated through role-playing activities like acting and simulation games (Dishon & Kafai, 2020). By putting oneself in the shoes of another, one might gain a more nuanced knowledge of the experiences and viewpoints of those who are different from oneself. An individual can learn about the values and beliefs of another culture by, say, acting out a role as a character from that culture in a role-playing exercise

(Chesler & Fox, 1966). Therefore, it is possible to increase one's perspective-taking skills through cultivating a sense of responsibility and participating in role-playing exercises. Decisions can be made with more knowledge and compassion if participants in these exercises broaden their understanding of the world around them.

Humans' ideas and actions are profoundly influenced by the social and cultural contexts in which they are formed. It's true that people's ideas and actions are strongly influenced by the norms and values of the society in which they were raised. The beliefs, values, attitudes, and conventions that make up a person's cultural milieu have a significant impact on the person's worldview and behaviour. Individuals' views on, say, gender roles, the value of education, and the meaning of success may be shaped by societal values and conventions. The perspectives of individuals on a variety of political and social problems, including race, immigration, and the environment, can be influenced by their cultural background. Individuals' information processing and decision making can also be impacted by cultural and societal factors. Individuals' risk perceptions and the choices they make when faced with ambiguity may, for instance, be influenced by cultural norms and normative expectations. The cultural context in which an individual lives can have an effect on his or her problem-solving and decision-making styles, as well as the kinds of answers and choices that are deemed to be reasonable or even desirable. In addition, cultural and societal influences can shift over time in reaction to novel ideas, social shifts, and historical developments. For instance, the way people think and act about gender equality and LGBTQ rights has changed dramatically as a result of shifts in public beliefs. In conclusion, the characteristics of society and culture have long-lasting effects on people's mental processes, moulding their values, attitudes, and choices. Acquiring a

well-rounded perspective requires an awareness of the cultural and societal factors that shape people and the world around them.

Some actions can lead to more intellectual humility and openness. Recognizing that one's own thoughts and opinions may be wrong and being open to fresh facts and alternative perspectives are characteristics of intellectual humility. Curiosity about the world and other people, as well as a desire to try new things, are all aspects of an open person's personality. Examples of activities that can foster intellectual humility and openness are:

a. actively seeking out different points of view.

a. Using critical thinking: When you challenge your own preconceptions and viewpoints, you open yourself up to new information and perspectives, and you develop intellectual modesty.

b. Developing an empathic disposition: putting yourself in another's position helps you better grasp their point of view and broadens your own perspective.

c. Engaged listening: Learning to put yourself in the shoes of another person allows you to develop intellectual humility and a broader viewpoint.

d. Taking part in lifetime education: gaining a broader perspective and more tolerance can be achieved through a commitment to lifelong learning.

In sum, these activities can aid in the cultivation of intellectual modesty and openness, both of which are crucial for one's own development and the making of sound choices. Building intellectual modesty and receptivity helps people become more inquisitive, compassionate, and well-versed.

Intellectual modesty and candour can be strongly influenced by an organization's culture. The culture of a group is its members' consensus on what is

important in life and how they go about achieving their goals. Individuals' perspectives on their work and their interactions with others can be profoundly impacted by the culture that permeates an organisation. Intellectual modesty and openness, for instance, are more likely to flourish in a community where people are encouraged to share their thoughts and viewpoints while also listening to and learning from those of their peers. On the other hand, a culture of competition or hierarchy in the workplace might make people less open and humble in their thinking, since they are more prone to stick to their own convictions and refuse to hear out other points of view. It's also worth noting that different people have different impacts on the culture of a company or organisation. Individuals can contribute to a culture that encourages intellectual humility and openness by encouraging collaboration, open communication, and a willingness to examine diverse ideas. Therefore, intellectual modesty and openness are significantly influenced by the culture of an institution. Whereas intellectual humility and openness may be discouraged in hierarchical or competitive environments, they are more likely to flourish in environments that encourage collaboration, open communication, and a willingness to examine diverse ideas. Individuals can aid institutional growth and sound decision-making by cultivating a culture that values intellectual modesty and openness.

Curiosity is crucial to one's development and education. Curiosity is the motivation to gain knowledge and understanding via exposure to and investigation of novel situations, objects, and concepts. A person's likelihood of learning new things, asking pertinent questions, and otherwise participating actively in the environment around them increases when they are curious. Keeping a curious mind can help you in numerous ways like better learning, enhanced problem-solving skills, creative

development and worldview expansion, stronger connections with others and development as a person.

In sum, a healthy dose of curiosity is crucial to development and education. One's capacity for learning, problem solving, creativity, relationship building, and personal development are all enhanced by maintaining an open mind.

Having these traits of tolerance and humility is crucial for one's own development and sound decision-making. One definition of tolerance is the disposition to welcome and appreciate others despite their obvious distinctions from oneself in terms of values, principles, and practises. The ability to live with others amicably and have productive conversations and partnerships, even when they differ, is a crucial human trait. Tolerance encourages people to value and honour differences, as well as to develop better insight and compassion for their fellow humans. One definition of humility is the acceptance that one's prior assumptions and conclusions may have been mistaken and the openness to new information and viewpoints. One's ability to learn and grow, as well as to make wiser and more successful choices, depends on their level of humility. Being modest makes one more receptive to new information and experiences, and it encourages introspection and self-evaluation.

Finally, self-improvement and sound judgement depend on one's capacity for both tolerance and humility. One's connections, one's knowledge of the world, one's ability to think critically and act wisely are all enhanced by the development of these traits.

5.4 Limitations & Future directions

No studies are complete in themselves, leaving space for future endeavours and investigations. Likewise, the present study has also limitations, which the researcher has identified so far and can be covered by future researchers -

a. Interviews with the participants on their perspectives of intellectual humility and openness could not be done.
b. It would have been better if the study could reach participants from all 42 universities and more colleges in West Bengal.
c. There are other factors in students' and teachers' lives which might have surprising connections with their IH and OP, which the study could not address.
d. Participatory activities could have been paired with the self-reported questionnaires to better map both the constructs i.e., intellectual humility and openness and get more perspectives on both.
e. Administrators, parents, and policymakers as other stakeholders of higher education, could have been covered in this study.
f. Only one state was addressed in this study instead of a handful representation of 28 states in India.

5.5 Conclusion

Although empirical studies on intellectual humility started around the world soon after cognitive science explored the flexibility factor of the human brain and its association

with varieties of cognitive events in daily life, the roots of intellectual humility can be traced back to historical times of more than two thousand years. The Thirukkural way of humility by Saint Thiruvalluvar in ancient India is also a major historical reference to the practice of intellectual humility (Gajjam, 2022). Currently, it is one of the most discussed virtues in philosophy and psychology, with major emphasis laid down by John Templeton Foundation among its three domains for character virtue development (*Character Virtue Development - Funding for Research and Practice*, n.d.). At the same time, it is thought to have an influence on personality traits as proposed in the Big Five theory. The present research found intellectual humility as positively linked with openness which the researcher think, is of very high importance in today's knowledge society and therefore necessary to let people enjoy the pleasure of being open and intellectually humble. In achieving this, we must talk about these phenomena at home through informal conversations, in large scale at public gatherings, educational setups etc. so that, people get to know about the virtues and nourish those in the journey of human being instead of human doing.

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APPENDICES

Appendix A

The Comprehensive Intellectual Humility Scale

Independence of Intellect and Ego	
1	(–) When someone disagrees with ideas that are important to me, it feels as though I'm being attacked.
2	(–) When someone contradicts my most important beliefs, it feels like a personal attack.
3	(–) I tend to feel threatened when others disagree with me on topics that are close to my heart.
4	(–) When someone disagrees with ideas that are important to me, it makes me feel insignificant.
5	(–) I feel small when others disagree with me on topics that are close to my heart.
Openness to Revising One's Viewpoint	
6	I have at times changed opinions that were important to me, when someone showed me I was wrong.
7	I am willing to change my position on an important issue in the face of good reasons.
8	I am open to revising my important beliefs in the face of new information.
9	I am willing to change my opinions on the basis of compelling reason.
10	I'm willing to change my mind once it's made up about an important topic.
Respect for Others' Viewpoints	
11	I respect that there are ways of making important decisions that are different from the way I make decisions.
12	Even when I disagree with others, I can recognize that they have sound points.
13	I welcome different ways of thinking about important topics.
14	I can have great respect for someone, even when we don't see eye-to-eye on important topics.
15	I can respect others, even if I disagree with them in important ways.
16	I am willing to hear others out, even if I disagree with them.
Lack of Intellectual Overconfidence	
17	(–) My ideas are usually better than other people's ideas.
18	(–) For the most part, others have more to learn from me than I have to learn from them.
19	(–) When I am really confident in a belief, there is very little chance that belief is wrong.
20	(–) I'd rather rely on my own knowledge about most topics than turn to others for expertise.
21	(–) On important topics, I am not likely to be swayed by the viewpoints of others.
22	(–) Listening to perspectives of others seldom changes my important opinions.

Elizabeth J. Krumrei-Mancuso & Steven V. Rouse (2016) The Development and Validation of the Comprehensive Intellectual Humility Scale, Journal of Personality Assessment, 98:2, 209-221, DOI: 10.1080/00223891.2015.1068174

Appendix B

Openness Questions from the Big Five Inventory

	Statements
1	I see myself as someone who is original, comes up with new ideas.
2	I see myself as someone who is curious about many different things.
3	I see myself as someone who is ingenious, a deep thinker.
4	I see myself as someone who has an active imagination.
5	I see myself as someone who is inventive.
6	I see myself as someone who values artistic, aesthetic experiences.
7	(R) I see myself as someone who prefers work that is routine.
8	I see myself as someone who likes to reflect, play with ideas.
9	(R) I see myself as someone who has few artistic interests.
10	I see myself as someone who is sophisticated in art, music or literature.

Note: (R) denotes reversed-scored items.

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Appendix C

Student's Information Summary Sheet

Gender: Male / Female / Others

Age (in years):

Locality of residence: Urban / Rural

Family Structure: Nuclear family / Joint family

Marital status: Unmarried / Married

Your birth order: 1 / 2 / 3 / Above 3

Nature of institute you are currently studying: University / College

Name of the University / College:

Pursuing course level: UG / PG / Research degree / Teacher education course

Faculty under you are studying:

Arts, Humanities & Social Sciences
Science
Engineering & Technology
Commerce, Law & Management

Apart from your subject-related books, what kind of book do you like to read most of the time?

Fiction (adventure, thriller, horror, poetry, romance, classics etc.)
Non-fiction (biography, self-help, fact-based, essays etc.)

On average (except for specific situations), how much time you daily spent on any type of social media?

Less than 1 hour in a day
Between 1 & 4 hours in a day
More than 4 hours in a day
Not applicable to me

How often do you read the daily newspaper (print or digital)?

Almost never
Rarely
Sometimes when I am not otherwise occupied
Regularly

Appendix D

Teacher's Information Summary Sheet

Gender: Male / Female / Others

Age (in years):

Locality of residence: Urban / Rural

Family Structure: Nuclear family / Joint family

Marital status: Unmarried / Married / Prefer not to say

Nature of institute you are working presently: University / College

Name of the University / College:

Your professional designation:

Professor
Associate Professor
Assistant Professor
State Aided College Teacher
Part-time / Guest / Contractual Faculty Member

Faculty under you are studying:

Arts, Humanities & Social Sciences
Science
Engineering & Technology
Commerce, Law & Management

Your highest educational qualification

Post-doctoral level
PhD
M.Phil
Masters degree

Teaching experience

Less than five years
Between five and ten years
Between ten and twenty years
More than twenty years

Apart from your subject-related books, what kind of book do you like to read most of the time?

Fiction (adventure, thriller, horror, poetry, romance, classics etc.)
Non-fiction (biography, self-help, fact-based, essays etc.)
Other than mentioned

On average (except for specific situations), how much time you daily spent on any type of social media?

Less than 1 hour in a day
Between 1 & 4 hours in a day
More than 4 hours in a day
Not applicable to me

How often do you read the daily newspaper (print or digital)?

Almost never
Rarely
Sometimes when I am not otherwise occupied
Regularly

Appendix E

Data collection consent form

To
<<Name>>
Department of <<Department>>
<< University/College>>

Request for obtaining research data.

area of doctoral work:

Intellectual humility and openness in higher education

RESEARCHER
BIJOY KRISHNA PANDA
PhD Student, Department of Education, Jadavpur University, Kolkata

SUPERVISOR
PROF. MUKTIPADA SINHA
Professor, Department of Education, Jadavpur University, Kolkata

Introduction & Background

We all have limitations in our thinking, but those who are aware of it are much fitter for any purpose. Openness to opposing views and recognizing the fact that one's beliefs and opinions might be incorrect is a quality we call intellectual humility which people are not born with, but the quality they can certainly gift to themselves. In other words, intellectual humility is recognizing the limits of one's own knowledge and at the same time appreciating others' intellectual strength. It is also the basis of critical thinking which help us to grow more congruent and tolerant rather than simply open-minded. Intellectual courage and intellectual empathy as subsets of intellectual humility strengthen peoples' cooperative behaviour and therefore, are necessary skills for realizing happiness in a democratic, multicultural, multi-religious country like India. Therefore, it is necessary for every individual to practice religious and cultural tolerance to bring social harmony and sustainability by nurturing intellectual humility and openness.

The objective of my study is to recognize and measure the intellectual humility and openness of stakeholders in higher education and find out variations in terms of different factors associated with our demographics. For this study, I am only considering teachers and students at colleges and universities across West Bengal, due to time and resource constraints. I am also intending to compare the data between high-performing and moderate/low-performing higher educational institutions to see if the environment of the institution has anything to do with the nourishment of intellectual humility among its stakeholders.

I am hereby approaching for your kind cooperation and participation in my research work.

Requirements & Guidelines for Participation

For this purpose, I am using a composite questionnaire involving measurement of intellectual humility and open-mindedness which is hosted online through Google Form to reach as many students as possible of Presidency University, Kolkata. The form **will not collect** any of your **Personal Identity Details** to maintain the anonymity of your response. The questionnaire will take a maximum 15-20 minutes to complete.

Link for Questionnaire-

<<Link>>

I sincerely thank you for your valuable time and attention in this matter.

Appendix F

List of Participants' Universities and Colleges

Sl.	Name of the University	District
1	COOCH BEHAR PANCHANAN BARMA UNIVERSITY	Cooch Behar
2	JADAVPUR UNIVERSITY	Kolkata
3	KAZI NAZRUL UNIVERSITY	Paschim Barddhaman
4	NETAJI SUBHAS OPEN UNIVERSITY	Kolkata
5	PRESIDENCY UNIVERSITY	Kolkata
6	RAIGANJ UNIVERSITY	Uttar Dinajpur
7	SIDHO-KANHO-BIRSHA UNIVERSITY	Purulia
8	UNIVERSITY OF BURDWAN	Purba Barddhaman
9	UNIVERSITY OF CALCUTTA	Kolkata
10	UNIVERSITY OF GOUR BANGA	Malda
11	UNIVERSITY OF KALYANI	Nadia
12	VIDYASAGAR UNIVERSITY	Paschim Medinipur
13	VISVA BHARATI	Birbhum
14	WBUTTEPA	Kolkata
15	WEST BENGAL STATE UNIVERSITY	North 24 Parganas
16	BANKURA UNIVERSITY	Bankura
17	DIAMOND HARBOUR WOMEN'S UNIVERSITY	South 24 Parganas
18	JIS UNIVERSITY	North 24 Parganas
19	MAKAUT	Nadia
20	THE SANSKRIT COLLEGE AND UNIVERSITY	Kolkata
21	UNIVERSITY OF NORTH BENGAL	Darjeeling
22	RAMKRISHNA MISSION VIVEKANANDA UNIVERSITY	Howrah

Sl.	Name of the College	District
1	ABN SEAL COLLEGE	Cooch Behar
2	ACHARYA PRAFULLA CHANDRA COLLEGE	South 24 Parganas
3	ANANDA MOHAN COLLEGE	Kolkata
4	ASUTOSH COLLEGE	Kolkata
5	BANGABASI COLLEGE	Kolkata
6	BANGABASI EVENING COLLEGE	Kolkata
7	BARRACKPORE RASTRAGURU SURENDRANATH COLLEGE	North 24 Parganas
8	BARUIPUR COLLEGE	South 24 Parganas
9	BASANTI DEVI COLLEGE	Kolkata
10	BEHALA COLLEGE	Kolkata
11	BEJOY NARAYAN MAHAVIDYALAYA	Hooghly
12	BHAIRAB GANGULY COLLEGE	Kolkata
13	BHIMPUR MOHANANANDA COLLEGE OF EDUCATION	Nadia
14	BOLPUR COLLEGE	Birbhum
15	BUJANGA BHUSHAN USHANGINI B ED INSTITUTION	Murshidabad
16	CITY COLLEGE, KOLKATA	Kolkata
17	COOCH BEHAR GOVERNMENT ENGINEERING COLLEGE	Cooch Behar
18	DARJEELING GOVERNMENT COLLEGE	Darjeeling
19	DEWAN ABDUL GANI COLLEGE	Dakshin Dinajpur
20	DEWANHAT MAHAVIDALAYA COOCHBEHAR	Cooch Behar
21	DINABANDHU MAHAVIDYALAYA	North 24 Parganas
22	DR A P J ABDUL KALAM GOVERNMENT COLLEGE	North 24 Parganas
23	DUKHULAL NIBARAN CHANDRA COLLEGE	Murshidabad
24	DUM DUM MOTIJHEEL COLLEGE	South 24 Parganas
25	FAKIR CHAND COLLEGE	South 24 Parganas
26	GANDHI CENTENARY B.T COLLEGE HABRA	North 24 Parganas
27	GHOOM JOREBUNGLOW COLLEGE	Darjeeling
28	GOBARDANGA HINDU COLLEGE	North 24 Parganas
29	GOKHALE MEMORIAL GIRLS' COLLEGE	Kolkata
30	GOURAV GUIN MEMORIAL COLLEGE	Paschim Medinipur
31	GOVERNMENT COLLEGE OF PHYSICAL EDUCATION FOR WOMEN	Cooch Behar
32	GOVERNMENT GENERAL DEGREE COLLEGE SALBONI	Paschim Medinipur
33	GOVERNMENT GENERAL DEGREE COLLEGE, MANBAZAR II, PURULIA	Purulia
34	GOVT GENERAL DEGREE COLLEGE, KALNA 1	Purba Bardhhaman
35	GOVT. GENERAL DEGREE COLLEGE, KHARAGPUR	Paschim Medinipur

Sl.	Name of the College	District
36	GURUDAS COLLEGE	Kolkata
37	GUSHKARA MAHAVIDYALAYA	PURBA BARDHAMAN
38	HALDIA INSTITUTE OF TECHNOLOGY	Haldia
39	HARISHCHANDRAPUR COLLEGE	Malda
40	HIRALAL MAJUMDAR MEMORIAL COLLEGE FOR WOMEN	Kolkata
41	HOOGHLY MOHSIN COLLEGE	Hooghly
42	INDAS MAHAVIDYALAYA	Bankura
43	JALANGI MAHAVIDYALAYA	Murshidabad
44	JANGIPUR COLLEGE	Murshidabad
45	JHARGRAM RAJ COLLEGE	Jhargram
46	JIBANTALA ROKEYA MAHAVIDYALAYA	South 24 Parganas
47	KABI JAGADRAM ROY GOVT. GENERAL DEGREE COLLEGE	Bankura
48	KALNA COLLEGE	Purba Bardhhaman
49	KIDDERPORE COLLEGE	Kolkata
50	KRISHNAGAR GOVT. COLLEGE	Nadia
51	KURSEONG COLLEGE	Darjeeling
52	MAHADEVANANDA MAHAVIDYALAYA	Kolkata
53	MAHARAJA MANINDRA CHANDRA COLLEGE	Kolkata
54	MAHISHADAL RAJ COLLEGE	Purba Medinipur
55	MALDA GOVERNMENT TEACHERS' TRAINING COLLEGE	Malda
56	MATIABURJ COLLEGE	Kolkata
57	MAULANA AZAD COLLEGE, KOLKATA	Kolkata
58	NABA BALLYGUNGE MAHAVIDYALAYA	Kolkata
59	NETAJI SATABARSHIKI MAHAVIDYALAYA	North 24 Parganas
60	P. D. WOMEN'S COLLEGE, JALPAIGURI	Jalpaiguri
61	P.R. THAKUR GOVT. COLLEGE	North 24 Parganas
62	PANCHLA MAHAVIDYLAYS	Howrah
63	PANCHUR COLLEGE	Kolkata
64	PANSKURA BANAMALI COLLEGE (AUTONOMOUS)	Purba Medinipur
65	PARIMAL MITRA SMRITI MAHAVIDYALAYA	Jalpaiguri
66	PRASANTA CHANDRA MAHALANOBIS MAHAVIDYALAYA	Kolkata
67	RAJA NARENDRA LAL KHAN WOMEN'S COLLEGE	Paschim Medinipur
68	RAJA PEARY MOHAN COLLEGE	Hooghly
69	RAJENDRA ACADEMY FOR TEACHERS' EDUCATION	Nadia
70	RAMAKRISHNA MISSION VIVEKANANDA CENTENARY COLLEGE	North 24 Parganas
71	RAMAKRISHNA SARADA MISSION VIVEKANANDA VIDYABHAVAN	Kolkata

Sl.	Name of the College	District
72	RAMKRISHNA MAHATO GOVT ENGINEERING COLLEGE	Purulia
73	RAMMOHAN COLLEGE	Kolkata
74	RCC INSTITUTE OF INFORMATION TECHNOLOGY	Kolkata
75	RISHI BANKIM CHANDRA COLLEGE	North 24 Parganas
76	SADHAN CHANDRA MAHAVIDYALAYA	South 24 Parganas
77	SAROJINI NAIDU COLLEGE FOR WOMEN	Kolkata
78	SATYAPRIYA ROY COLLEGE OF EDUCATION	Kolkata
79	SETH ANANDRAM JAIPURIA COLLEGE	Kolkata
80	SEWNARAYAN RAMESWAR FATEPURIA COLLEGE	Murshidabad
81	SHREE RAMAKRISHNA B T COLLEGE DARJEELING	Darjeeling
82	SISTER NIBEDITA GOVT GENERAL DEGREE COLLEGE FOR GIRLS	Kolkata
83	SITANANDA COLLEGE	Purba Medinipur
84	SONARPUR MAHAVIDYALAYA	South 24 Parganas
85	SOUTH CALCUTTA GIRL'S COLLEGE	Kolkata
86	SOVARANI MEMORIAL COLLEGE	Howrah
87	ST XAVIER'S COLLEGE (AUTONOMOUS) KOLKATA	Kolkata
88	SURENDRANATH EVENING COLLEGE	Kolkata
89	SURI VIDYASAGAR COLLEGE	Birbhum
90	SUSHIL KAR COLLEGE	South 24 Parganas
91	SYAMAPRASAD COLLEGE	Kolkata
92	TDB COLLEGE, RANIGANJ	Paschim Bardhhaman
93	TRIVENIDEVI BHALOTIA COLLEGE	Paschim Bardhhaman
94	VIDYASAGAR COLLEGE	Kolkata
95	VIDYASAGAR COLLEGE FOR WOMEN	Kolkata
96	VIDYASAGAR METROPOLITAN COLLEGE	Kolkata
97	VIVEKANANDA COLLEGE	Kolkata
98	WOMEN'S CHRISTIAN COLLEGE	Kolkata
99	WOMEN'S COLLEGE CALCUTTA	Kolkata
100	Y S PALPARA MAHAVIDYALAYA	Purba Medinipur

Appendix G

Originality Report checked by iThenticate

Intellectual Humility and Openness in Higher Education

By Bijoy Krishna Panda

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