

Personality Types and Preferred Lesson Delivery Methods Among Science, Technology, Engineering, and Math Students During Distance Learning¹

Grand D. Judan, Gracelyn H. Galvo, Jahziel A. Macaraig, Cyrelle C. Apalat, Elfieda C. Esquero, Diva Subarto, and Mercedes M. Ibanez, Adventist University of the Philippines Academy

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Abstract

During the COVID-19 pandemic, students had to adapt to different online learning strategies and approaches. In this study, the aim was to determine what lesson delivery methods would cater to and satisfy the learning needs of students with different personality types. Students of the Adventist University of the Philippines Academy were selected as participants in this descriptive-correlational study. The data showed that participants' personalities revealed average levels of extraversion, conscientiousness, neuroticism, and openness, and high levels of agreeableness. The three lesson delivery methods used, namely, synchronistic, recorded videos, and textual formats were all perceived as very good. Students with conscientiousness and openness personality traits preferred to experience all three lesson delivery methods, while those with high agreeableness preferred having synchronistic and recorded delivery methods. Students with high scores on the extraversion and neuroticism personality scales preferred a synchronistic lesson delivery method. Furthermore, agreeableness predicted a preference for the synchronistic delivery method. Finally, female students learned better when exposed to video recorded lessons. It was concluded that personality traits were associated with the effectiveness of lesson delivery methods as perceived by the students.

Keywords: *Personality traits, learning strategies, distance learning, satisfaction*

Introduction

A teaching strategy is directed by one's belief about learning, and it influences and affects the experiences that teachers provide to students. The context of the teaching situation, as well as students' learning situations, also helps to identify appropriate instructional modes, such as teaching face-to-face courses or online learning approaches. Students were forced to adapt to different online learning strategies and approaches that served as alternatives to face-to-face learning setups because of the COVID-19 pandemic. Online learning was necessary during the pandemic. This is also referred to as e-learning, online education, or distance learning, and is defined as synchronous or asynchronous learning experiences involving the use of devices through access to the Internet (Yen & Nhi, 2021). Online learning platforms like Zoom, Google Classroom, and MS Teams have increased in use since the start of the pandemic (Singh & Awasthi, 2020). Utilizing effective methods of lesson delivery during online education is essential for the overall learning satisfaction of students.

Learners' personality traits play a significant role in their academic choices and accomplishments. A connection between students' personality types and their learning approaches and absorption of information has been found in some studies. A study by Seyal et al. (2019) indicated that there was a relationship between the big five personality traits and the preferred lesson delivery methods among students.

Personality traits are distinctive patterns of thoughts, feelings, and behaviors that people exhibit (Diener & Lucas, 2022). Personality traits tend to be consistent and stable. Thus, trait psychology is based on the premise that people differ from one another based on their personality traits. The five-factor model is the most extensively used personality trait system (Chmielewski & Morgan, 2013).

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Edwin van Thiel (2022) indicated that the "Big Five Personality" system is the most scientifically validated and reliable psychological model to test personality. It consists of five major traits consisting of openness, conscientiousness, extraversion, agreeableness, and neuroticism. *Openness* is a characteristic that includes imagination and insight. It leads to having a broad range of interests, and being more adventurous when it comes to decision making. *Conscientiousness* is a trait that includes high levels of thoughtfulness, good impulse control, and goal-directed behaviors. A highly conscientious person regularly plans ahead and analyzes personal behavior to see how it affects others. *Extraversion* is a trait that many encounter in their lives. This trait, among other things, includes talkativeness, assertiveness, and high amounts of emotional expressiveness. People who exhibit high *Agreeableness* show signs of trust, altruism, kindness, and affection. *Neuroticism* is characterized by sadness, moodiness, and emotional instability. It is often mistaken for anti-social behavior or worse. Neuroticism is a physical and emotional response to stress and perceived threats in one's daily life (McCrae & Costa, 1987; Goldberg, 1993; Smith, 1967; Norman, 1967; Fiske, 1949).

Moreover, these personality traits are important factors to consider when considering different lesson delivery methods. These include video recordings, synchronous meetings, and textual modules. Certain personality characteristics have been found to be positively correlated with deep approaches to learning, effective learning strategies, better time and effort management, and organizational skills (Agler et al., 2020). Murphy et al. (2020) indicated that students displayed strong preferences both for and against certain teaching methods that suited their temperaments, abilities, and experiences.

The online learning experiences to which students were exposed in previous studies included structured, pre-recorded video lectures provided by the instructor. These offered video simulations with clear audio and good visualization, and covered a broad scope of topics, allowing the students to learn at their own pace and re-watch them if needed. Synchronous meetings were also used, and these represented live meetings wherein teachers met virtually with their students at certain times in different online learning platforms such as MS Teams, Google Classroom, and Zoom to discuss their course lessons. Synchronous meetings allow live interaction between the students and the instructor, which creates a learning atmosphere similar to face-to-face classes (Grover et al., 2021). In addition, self-learning modules can be used to provide online learning materials. They were made available by schools and educators to students for study at their own pace, which ensured quality learning amidst the ongoing pandemic (Department of Education, Philippines, 2020).

Choe et al. (2019) found that asynchronous online lecture videos increased learner satisfaction and even engagement. Similarly, live or synchronous meetings positively affected learners' satisfaction during online classes, which allow real-time consultation, questioning, responses, and reflection (Zeng & Wang, 2021). Zeng and Wang's study indicated that providing synchronous meetings for addressing queries was essential to supplement lessons taught through live meetings. Lastly, regarding textual learning, Gillan et al. (2018) reported that user interaction satisfaction was higher when an e-module with more textual contents was used in contrast to one that primarily provided more video content.

Moreover, the gender of students can influence their learning abilities. Research by Basuony et al. (2020) showed that most females are read and write learners (50.7%), and regularly take notes and make drawings for future reference. Meanwhile, males were found to be mostly kinesthetic learners (29.3%), meaning they do best when given hands-on experiences and high-energy activities. These findings were consistent with Grollino and Velayo's (1996) study, where males generally attributed their achievements to external causes like teaching, while females credited success to their own study efforts. Hence, it was suggested that males are more externally focused, whereas females are more self-reflective (Wehrwein et al., 2007). This means that gender, as well as personality traits, influences individual lesson delivery preferences. Future studies have also been urged to incorporate personal variables and learner attributes like gender that can affect online learning. (Al-Nasa'h et al., 2021). Moreover, Cabual (2021) mentioned that age is not a factor in learning styles, and preferred learning modalities in the new normal since all learners were increasingly likely to attend both synchronous and asynchronous classes.

The personality traits of students and their impact on perceptions of distance learning usability has often been overlooked (Vlachogianni & Tselios, 2021). In the last few years, however, studies have been done to analyze external factors, specifically personality types and traits that affect a student's learning motivation and satisfaction (Sorić et al., 2017). However, there is a need to investigate specific online learning design elements and how these may influence the perception of adequacy held by those with various personality traits (Bhagat et al., 2019). Thus, the purpose of this study was to determine whether the big five personality traits of students were related to their preferred lesson delivery methods.

Statement of the Problem

This study aimed to determine the relationship between personality types and preferred lesson delivery methods. Specifically, this study sought to answer the following questions:

1. What personality types were represented among the participants in the study?
2. What were the perceptions of respondents regarding the lesson delivery methods involving synchronistic, recorded video, and textual approaches?
3. Were students' personality types significantly associated with the preferred lesson delivery method?
4. Among the personality traits identified, which best predicted the preferred lesson delivery methods of the respondents?
5. Did gender influence the preferred lesson delivery methods of respondents?

Methodology

Research Design

A descriptive-correlational approach was used in this study. The descriptive element was used to determine the personality types of the participants and their preferred lesson delivery methods. The relationships between a student's personality type and preferred lesson delivery methods were analyzed using well-known correlation and regression methods.

Population and Sampling Technique

The student population used in the study were Science, Technology, Engineering, and Mathematics, or STEM, students at Adventist University of the Philippines Academy who were enrolled during the second semester of 2021–2022. A cluster sampling technique was used to select 110 students. This sampling approach was preferred as participants were grouped by strand, and they were experiencing the three lesson delivery methods at the same time. The majority (55%) of respondents were female, and the remainder male.

Instrumentation

The researchers prepared a questionnaire that was divided into three parts as follows:

1. *Respondent's Profile Evaluation.* This part of the questionnaire identified the participants' gender, which was used as the moderating variable.
2. *Big Five Inventory for Personality Type.* The five-factor model, also known as the "Big Five," is the most widely used and scientifically supported model for personality traits (Chmielewski & Morgan, 2013). It was constructed by Goldberg (1993), and it encompasses five personality traits such as extraversion, agreeableness, conscientiousness, neuroticism, and openness. This 44-item test was used to evaluate the personality traits of the participants. The results were scored using a 5-point Likert scale, with five being the highest (*Strongly Agree*) and one being the lowest (*Strongly Disagree*).
3. *Lesson Delivery Methods Evaluation.* This section of the questionnaire involved a 30-item test regarding the evaluation of the three lesson delivery methods. Each lesson delivery method was allocated 10 questions, and these were scored on a 5-point Likert scale, ranging from 5 (*Always*) to 1 (*Never*).

These instruments were assessed by experts for validity and reliability. Table 1 shows the results obtained for the reliability test. A score of more than .70 is considered acceptable. However, some authors suggest higher values of .90 to .95 (Salkind, 2015; Tavakol & Dennick, 2011; Lavrakas, 2008). Hence, all personality traits and lesson delivery questions were acceptable and were retained.

Table 1 Reliability Test Result of Personality Traits, and Lesson Delivery Methods

| Subscale | Cronbach Alpha | Interpretation |
|-------------------------|----------------|----------------|
| Personality Traits | | |
| Extraversion | .803 | Acceptable |
| Agreeableness | .723 | Acceptable |
| Conscientiousness | .807 | Acceptable |
| Neuroticism | .720 | Acceptable |
| Openness | .813 | Acceptable |
| Lesson Delivery Methods | | |
| Synchronistic Method | .852 | Good |
| Recorded Video Method | .914 | Good |
| Textual Method | .857 | Good |

All negative statements were recoded before the means of every variable were computed. Table 2 shows the rating scale for interpretation used in the study.

Table 2 Mean Interval, Response Scale, and Interpretation

| Mean Interval | Response Scale | Response Scale | Interpretation |
|---------------|----------------|-------------------|----------------|
| 4.50–5.00 | Always | Strongly Agree | Very High |
| 3.50–4.49 | Often | Agree | High |
| 2.50–3.49 | Sometimes | Moderately Agree | Average |
| 1.50–2.49 | Rarely | Disagree | Low |
| 1.00–1.49 | Never | Strongly Disagree | Very Low |

Data Gathering Procedures

Ethics approval was received from the Review Board at Adventist University of the Philippines prior to the study being commenced. The principal of the University's Academy was contacted by letter outlining the purpose and objectives of the study, and the non-disclosure provisions involved. The student participants were familiarized with the Google Form and informed of the ethics approval conditions governing the study. Anonymity and confidentiality were observed throughout the study.

Data Analysis

The data collected from the Google Form was aggregated in an Excel file and exported into SPSS version 21.0 to apply different statistical analytical processes. Descriptive statistics were used to find the levels of personality traits and the preferred lesson delivery methods of the respondents. For inferential statistics, Pearson's correlation was utilized to find the relationship between the participants' personality traits and preferred lesson delivery methods. The predictors of lesson delivery method were identified using multiple regression analysis. Furthermore, a *t*-test was used to determine if there was a significant difference in students' preferred lesson delivery methods when gender was considered.

Results and Discussion

Level of Personality Types of the Respondents

The personality traits are presented in Table 3. It is readily observed that all personality traits, with the exception of agreeableness, were at the average level.

The results imply that respondents had a great deal of interest in other people, were willing to assist others who were in need of help, and enjoyed helping and contributing to the happiness of other

people. They were moderately open to trying new things, they focused on tackling new challenges, and they were willing to spend time preparing and finishing important tasks right away. They enjoyed being the center of attention, found it easy to make new things, and sometimes were easily upset and struggled to bounce back after stressful events.

Table 3 Level of Personality Traits of the Participants of the Study

| Personality Trait | Mean | SD | Scaled Response | Interpretation |
|-------------------|------|------|------------------|----------------|
| Extraversion | 3.06 | 0.73 | Moderately Agree | Average |
| Agreeableness | 3.77 | 0.63 | Agree | High |
| Conscientiousness | 3.45 | 0.64 | Moderately Agree | Average |
| Neuroticism | 3.41 | 0.69 | Moderately Agree | Average |
| Openness | 3.49 | 0.63 | Moderately Agree | Average |

Personality traits represent the distinctive thoughts, feelings, and behavior patterns that people possess. Individuals who scored high on a particular characteristic, such as extraversion, can be assumed to be socially active at a variety of times and in various situations (Diener & Lucas, 2022).

Research conducted by Cohen and Baruth (2017) indicated that openness and conscientiousness were significant predictors of learning satisfaction. Furthermore, the findings showed that groups with the same personality traits preferred the same method of synchronous lesson delivery.

Preferred Lesson Delivery Methods of the Respondents

Table 4 shows that all lesson delivery methods were highly preferred by the students. Furthermore, it indicated that teachers were effectively preparing and utilizing the three methods during distance learning.

Table 4 Preferred Lesson Delivery Methods of the Participants of the Study

| Lesson Delivery Method | Mean | SD | Scaled Response | Interpretation |
|------------------------|------|------|-----------------|------------------|
| Synchronous | 3.97 | 0.57 | Often | Highly Preferred |
| Recorded Video | 4.22 | 0.63 | Often | Highly Preferred |
| Textual | 3.80 | 0.58 | Often | Highly Preferred |

Synchronous Meetings. The findings of Harris et al. (2021) showed that live lectures were preferred over pre-recorded lectures because they were more engaging and interactive, although they were also more stressful. The advantages of live lecturers are that they provide a structured learning schedule, may aid students in managing their workloads, and they are also more interactive. Participants indicated that when pre-recorded lectures were available, note making and discussion of the contents with their friends were more prevalent than was the case with live lectures. The flexibility of the pre-recorded format was considered an attractive feature. Overall, a hybrid approach seemed to be preferred. Using a different approach, Phanse and Chavan (2021) investigated the use of pre-recorded teaching content in contrast to live online lectures. Participants preferred the pre-recorded format over Zoom lectures because they were considered to be significantly more helpful. Other findings (e.g., Moradi et al., 2018) indicated that the helpfulness of online presentations can be improved by making question and answer provisions.

Video Lectures. Research conducted by Moradi et al. (2018) on the effectiveness of teaching mathematics and physics using instructional videos indicated that participants preferred live lectures to video presentations. However, study participants indicated that a video format allowed them to learn at their own speed. An important feature of this study involved the effectiveness of an innovation introduced in the video presentations given to an intervention group. This group was presented first with a clear concept, followed by examples illustrating its application. Questions were embedded in the video presentation which, when answered, received immediate feedback. Meanwhile, the control group watched videos on random topics addressing relevant concepts and problems with no embedded questions. The incorporation of quizzes into the videos was well received

by the intervention group and contributed to their superior performance. The majority of intervention participants felt that the incorporation of video instructional material was useful, as it contributed to the learning process and their preparedness to solve problems.

In a study conducted by Phanse and Chavan (2021), the effectiveness of live Zoom lectures was contrasted with pre-recorded video lectures. Students showed a preference for the latter as they gave flexibility, were convenient, and were educationally satisfying. It is suggested that the reasons contributing to the preference for pre-recorded video lectures were that they allowed students to control the content by clicking stop, play, rewind, and being able to listen to it repeatedly, which benefited students since they had better self-regulation.

Textual Lessons. These lessons refer to PowerPoint slides, documents, or any lesson materials that are written or typed. In a study by Dangle and Sumaoang (2020), learning through printed and digital modules emerged as the most preferred method for learners in rural areas in the Philippines where the Internet was not accessible for online learning. A variety of challenges were identified by students, parents, and teachers. Most students had difficulty independently answering questions in the modules, and they badly needed assistance from family members, relatives, and friends. There were also time constraints on completing work, along with continual issues with the terms used and comprehension.

Lastly, a study conducted by Dargo and Dimas (2021) showed that modular distance learning had more negative effects than positive ones. These included the absence of socialization with other students, lack of exposure to physical school activities, presence of typographical errors in some self-learning modules, the additional workload placed on working parents, and distractions at home.

Relationship of Personality Types and Preferred Lesson Delivery Methods

The study's results on the relationships among personality traits and preferred lesson delivery methods are presented in Table 5.

Table 5 Relationship of the Big Five Personality Traits to Learning Satisfaction

| Lesson Delivery Method | Extraversion | Agreeableness | Conscientiousness | Neuroticism | Openness |
|------------------------|--------------|---------------|-------------------|-------------|----------|
| Synchronous | .317*** | .481*** | .435*** | .159 | .246** |
| Recorded Video | .075 | .231* | .412*** | .252** | .376*** |
| Textual | .080 | .161 | .269** | .079 | .324*** |

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Extraversion had a weak positive association with the synchronous learning method ($p < .001$). This further explains why extraverted students want to interact; they are talkative, assertive and they have high amounts of emotional expressiveness. Additionally, these students prefer the synchronous method, as they enjoy being the center of attention, find it easy to make new friends, and feel energized when being around other people.

Agreeableness had a moderate positive relationship with the synchronous method ($p < .001$) and a weak positive relationship with recorded video method ($p < .05$). Agreeable students showed signs of trust, altruism, kindness, and affection, which were traits exhibited during synchronous and asynchronous classes using recorded videos. Moreover, students who enjoyed helping and contributing to the happiness of other people preferred synchronistic and recorded video lessons.

Conscientiousness and *Openness* displayed positive relationships with all three lesson delivery methods. *Conscientiousness* showed a moderate positive relationship with both the synchronous method ($p < .001$) and the recorded video methods, and a weak positive relationship with the textual delivery method ($p < .01$). On the other hand, *Openness* had weak positive relationships with the synchronous method ($p < .01$), recorded video method ($p < .001$), and textual method ($p < .001$). Students who are high in openness personality traits are imaginative and have good insight. Conscientious and open students spend time preparing, finish important task right away, pay attention

to detail, enjoy having a set schedule, are very creative and open to trying new things, and are happy to think about abstract concepts. These are the reasons why they preferred all three different lesson delivery methods.

Neuroticism showed a weak positive relationship with the recorded video teaching method ($p < .01$). Lastly, students who were experiencing a lot of stress and worries about many different things may get upset easily, experience dramatic shifts in mood, and feel anxious, preferring only recorded video lessons.

Patitsa et al. (2021) found that students with higher levels of overall satisfaction with synchronous online academic learning showed higher degrees of extraversion, conscientiousness, openness, and agreeableness. They found a weak positive relationship between the traits openness and conscientiousness with synchronous online academic learning. This supports the findings of the current study, which indicated a positive relationship between agreeableness and the synchronistic method. However, unlike the findings of Audet et al. (2021), only openness was found to be strongly related to online engagement. These studies imply that there is a positive relationship between the synchronistic lesson delivery method and individuals whose dominant personality traits are extraversion, agreeableness, conscientiousness, and openness.

According to Sahanidis and Tsaknis (2021), openness and conscientiousness had a considerable positive influence on learners' satisfaction with synchronous online classes, but neuroticism had a negative impact. On account of students' tendency to perceive more stress, those with high levels of neuroticism may have the most difficulty adjusting to the ambiguous environment of online classrooms. This further explains why students with neuroticism may prefer recorded video lessons. Moreover, Audet et al. (2021) stated that students with extraversion, conscientiousness, openness, and agreeableness preferred synchronistic online delivery methods.

Cohen and Baruth (2017) discovered that it was feasible to categorize online learners into groups. Furthermore, their study found that those who preferred similar synchronous channels had similar personality traits. Borg et al. (2021) also found that students preferred online synchronous collaboration over asynchronous collaboration. Additionally, they found that when in-person collaboration was limited, the use of online synchronous collaboration was helpful, but individual differences in personality traits could have varying influences on students' perceptions of and behaviors in collaborative situations. This therefore validates that personality traits have a relationship with online learners' preferred lesson delivery method.

Predictor of Preferred Lesson Delivery Method

The linear regression analysis performed in the present study indicated that agreeableness was a significant predictor of the synchronous method ($\beta = 0.3285$, $p < .001$). The coefficient of determination ($r^2 = .322$) showed that agreeableness explained 32.20% of the variation in the synchronous method. This further reinforces the findings from Pearson's correlation, which indicated that agreeableness was positively related to the synchronous presentation method. This finding means that students who have higher levels of the agreeableness trait also have higher learning satisfaction with the synchronous lesson delivery method.

This result implies that students who have a great deal of interest in other people and can make friends easily enjoy and learn best when experiencing the synchronous lesson delivery method. The agreeableness trait predicted positive perceptions about group work, which include satisfaction (Borg et al., 2021). Relevant results were also obtained by Bhagat et al. (2019), who found that agreeableness was a predictor of student perceptions of instructor characteristics. Their findings might not be directly related to learning satisfaction with the synchronistic method. But the agreeableness trait describes people who are optimistic and like to work with others, and also have a positive attitude toward new technologies.

Difference in Preferred Lesson Delivery Method when Gender is Considered

The results of the present study showed (Table 7) that there was a significant difference ($p < .05$) in the preferred lesson delivery method when the gender of the respondents was considered. This was particularly observable in relation to the recorded video method. From this, it can be concluded that females were more satisfied with the recorded video method of information presentation than males.

Table 6 Difference in Preferred Lesson Delivery Method when Gender is Considered

| Lesson Delivery Method | Group | N | Mean | SD | t | p | Interpretation |
|------------------------|--------|----|------|------|--------|------|-----------------|
| Synchronous | Male | 50 | 3.65 | 0.66 | -0.118 | .907 | Not Significant |
| | Female | 60 | 3.63 | 0.69 | | | |
| Recorded Video | Male | 50 | 3.92 | 0.67 | 3.195 | .002 | Significant |
| | Female | 60 | 4.30 | 0.58 | | | |
| Textual | Male | 50 | 3.40 | 0.72 | 1.267 | .208 | Not Significant |
| | Female | 60 | 3.58 | 0.74 | | | |

Males are kinesthetic learners, while females are aural learners or those who learn through audiovisual contents. Females are also self-reflective, whereas males are more externally focused. Additionally, females have stronger self-regulation in e-learning contexts (Yu, 2021). The results reported by Islam et al. (2020) indicated that since females are more organized and diligent, they would naturally prefer pre-recorded video lectures, since these would allow them to watch and study the videos conscientiously. These observations help to explain why females' learning satisfaction with the recorded video method is significantly higher than males.

Conclusion

The data obtained in this study led to the conclusion that personality traits are associated with the lesson delivery methods preferred by clients. The results showed that participants had high levels of agreeableness, and average levels of extraversion, conscientiousness, neuroticism, and openness. The synchronous, recorded video, and textual methods all received very good evaluations. There was a significant relationship between personality traits and preferred learning methods among students. The agreeableness trait appeared to be a significant predictor of learning satisfaction, particularly when the synchronous teaching method was used. There was a significant difference in the learning satisfaction of males and females with the recorded video method; females were more satisfied with the recorded video method than males.

Recommendation

Based on the conclusion, the following recommendations are proposed; teachers need to identify the personality traits of their students so that they can offer the lesson delivery methods preferred by each student. Teachers of classes that are predominantly composed of female students should consider utilizing recorded videos instead of synchronous classes and textual modules. Students could be more motivated to learn using their preferred lesson delivery method if they knew their own personality traits, their strengths and weaknesses, and their learning styles and study habits. Future researchers might consider having grade 7 to 12 high school students as potential participants, so that the study findings could be more generalizable. Furthermore, future researchers may use learning satisfaction as the primary variable, because if students were more satisfied with their classes, they would perform better and engage more readily in class activities.

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