Exploring the Perspectives of Tribhuvan University Undergraduate Students Toward Business Statistics: A Study of Shanker Dev Campus

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Abstract

This comprehensive study explored the intricate determinants of Tribhuvan University undergraduate students' attitudes toward business statistics, employing a mixed-methods approach to capture the multifaceted nature of their perceptions. Grounded in theoretical frameworks such as the Theory of Reasoned Action, Expectancy-Value Theory, Cognitive Load Theory, and Effort-Performance Theory, the research analyses the relationship and influence of cognitive competence, value, difficulty, and effort with students' attitudes. With a large sample size of 328 students, the study employs a descriptive and causal-comparative research design to uncover significant correlations between these variables. The regression results highlight the predictive power of cognitive competence, value, difficulty, and effort on students' attitudes, providing valuable insights for educators and stakeholders in enhancing the learning experience in business statistics. The findings underscore the dynamic interplay of these factors over time, emphasizing the need for tailored educational strategies and interventions to foster positive attitudes and outcomes in the field.

1. Introduction

Students who study business statistics not only gain the quantitative skills required for making decisions based on data, but they also gain a deeper comprehension of intricate patterns found in the business world. Examining the viewpoints and attitudes of undergraduate students toward the topic of business statistics becomes crucial as educators work tirelessly to enhance the undergraduate learning experience. Given that undergraduate education frequently lays the groundwork for future statistical understanding, it is critical to investigate the factors impacting students' perceptions of statistics. It is becoming more and more important to comprehend students' cognitive abilities when it comes to understanding statistical ideas, as evidenced by the difficulties and successes of previous teaching approaches. It is essential to recognize the importance that students place on the applicability of business statistics to their future pursuits to customize efficient teaching strategies. Furthermore, recollecting students' experiences about how hard they find business statistics to learn and how much work they put into it might provide insightful information. The development of instructional techniques that tackle difficulties and improve the learning process as a whole can be influenced by these reflections.

Undergraduate students' ability to think critically and make decisions is greatly enhanced by studying business statistics, especially in the quickly changing field of higher education (Lowe, 2023). There is a glaring lack of knowledge regarding the many aspects that influence students' attitudes toward this topic despite its essential relevance. Since attitudes have a significant influence on learning outcomes, it is necessary to close this gap and examine the complex interactions between cognitive ability, value, difficulty, and effort in forming students' attitudes in general (Dahal, 2018; Ghimire et al., 2023; Mahmud, 2010). This becomes especially important because undergraduate years are when most core statistical knowledge is normally imparted, so it becomes necessary to investigate how these factors affect students' views during this essential educational stage. The prevalence of statistics is obvious across industries as data have become an invaluable tool in the business arena, making business statistics courses a cornerstone for undergraduate and graduate business programs nationwide (Lowe, 2023).

Mahmud (2010) explores the differences between positive and negative attitudes among statistics learners, creating a profile for each type based on discriminative predictor identification. A burgeoning interest exists in understanding the relationship between attitude dimensions (Cognitive Competence, Value, and Difficulty) and student profiles, encompassing factors such as age, gender, and academic achievement in mathematics and statistics (Cashin & Elmore, 2005; Hilton et al., 2004). Developing adults who are adept at using statistical reasoning is the ultimate aim of statistics education, not only providing information (Schau & Emmioğlu, 2012). Emrich (2003) challenges the idea that a tension-free experience ensures positive student views by arguing that increasing student attitudes goes beyond simply making the course easier. Even a seemingly difficult course may elicit positive attitudes. This thorough investigation aims to add to the conversation on successful teaching in business statistics by

examining the complexities of cognitive ability, value, difficulty, and effort in forming students' attitudes in addition to the field's intellectual underpinnings.

What are the main factors influencing undergraduate students' attitudes toward business statistics, and how do cognitive competence, value, difficulty, and effort relate to each other? How can the understanding of these relationships help develop effective educational strategies and interventions that improve the learning process in this area? Does recognizing the accepted problems in the study background, especially regarding perceived difficulty, match directly with the variable of difficulty, impacting students' attitudes about business statistics? Through an examination of the historical background and an appreciation of the role that business statistics play in undergraduate students' academic careers, this study seeks to provide nuanced insights that can help educators, curriculum designers, and legislators foster a positive learning environment and better learning outcomes in the field of business statistics. The historical background highlights the critical role that business statistics has in forming students' analytical abilities during their undergraduate studies. This has a direct bearing on students' cognitive abilities because their grasp of statistical ideas shapes their perspective on the subject as a whole. The background highlights the importance of perceived value in shaping students' attitudes and highlights the relevance of business statistics to students' future jobs. The study is based on the following objectives:

i)   To analyze the correlation between students' attitudes towards business statistics and the cognitive competence, value, difficulty, and effort of business statistics students.

ii)   To examine the influence of students' attitudes toward business statistics classes.

This study seeks to provide nuanced insights that can help educators, curriculum developers, and policymakers foster positive attitudes and better business statistics learning outcomes by exploring the historical context and acknowledging the importance of business statistics in undergraduate education. History shows that business statistics shapes undergraduate analytical skills, which directly affects cognitive competency since students' grasp of statistical ideas affects their attitude toward the topic. The background emphasizes the importance of perceived value in shaping students' views and the relevance of business statistics to their careers.

The study introduction provided an overview of the research's setting and importance. The literature review examined prior research on cognitive capacity, value, difficulty, and effort as determinants of attitudes. The methodology section provided a comprehensive account of the research design, sampling techniques, and data-gathering methods. The data analysis primarily concentrated on descriptive statistics and examined the correlation between variables, with particular emphasis on the impact of effort on attitudes. The conclusion succinctly encapsulated

the primary discoveries, examined the ramifications, and proposed potential avenues for additional research.

2. Literature Review

The Theory of Reasoned Action (TRA), Expectancy-Value Theory, Cognitive Load Theory, and Effort-Performance Theory are all included in the theoretical framework that directs this investigation. According to TRA, people's intentions and subsequent actions are influenced by their attitudes about behavior, as well as by subjective norms and perceived behavioral control. TRA is used in this study to clarify how social norms and perceived value related to learning business statistics influence students' attitudes, the dependent variable (Hale et al., 2002). According to the Expectancy-Value Theory, attitudes and motivation are impacted by both the perceived value of a task and expectations for achievement (Joshi et al., 2023; Loh, 2019). This hypothesis aids in the explanation of how students' general attitude is influenced by their perceived value of business statistics as well as their cognitive capacity, an independent variable. Cognitive Load Theory, which proposes limits to information processing, is applied to understanding how perceived difficulty, an independent variable, may influence students' attitudes toward learning business statistics (Schnotz & Kürschner, 2007). According to the Effort-Performance Theory, which backs up the Effort variable, students who put in more effort to comprehend business statistics may have more positive attitudes about the topic (Muenks & Miele, 2017). When taken as a whole, these theoretical stances offer a thorough basis for delving into the complex interactions between important factors in the context of undergraduate students' perceptions of business statistics.

Cognitive competence, denoting the mental acumen of undergraduate students in comprehending statistical concepts within the area of business statistics, is a significant feature explored in this study (Duque Jr & Tan, 2018). In a study involving 127 students, Duque and Tan (2018) found that people with varying levels of mathematics anxiety displayed different metacognitive processes. They also found that while performance and confidence in learning mathematics were positively correlated, mathematics anxiety showed a negative correlation. Additionally, children with moderate anxiety showed test-anxious behavior, and low-anxiety students were quickly distracted. Still, they were able to refocus, and high-anxiety students tended to look for validation from others. Öztürk et al. (2020) conducted a relevant study that investigated the impact of reading comprehension, mathematics self-efficacy, and mathematics attitude on middle school students' non-routine problem-solving abilities. Their results showed strong correlations between these variables; hierarchical regression analysis showed that problem-solving abilities were highly predicted by reading comprehension and mathematics self-efficacy, which accounted for 22% of the variation.

Wang et al. (2018) emphasized the need to use the Survey of Attitudes toward Statistics (SATS) to measure noncognitive dimensions of attitudes among undergraduate business students.

Nonis and Hudson (1999) emphasized the significance of aligning business statistics education with practical application, emphasizing the development of critical skills. However, Nguyen et al. (2016) found a strong correlation between academic accomplishment and attitudes toward statistics, with views of the learning environment indirectly accounting for 29% of academic achievement. In their investigation of the views of Indian business school students regarding statistics, Sharma and Srivastav (2021) found that while there was a generally positive perception, it was stronger at the start of the semester. The attitude toward statistics is not significantly correlated with statistical literacy, according to a study by Abd Jalal et al. (2023) that examines the statistical literacy of education policymakers. However, statistical anxiety is correlated with statistical literacy and contributes to the Model of Statistical Literacy. In the study by Al-Obayd et al. (2023), 114 participants' cognitive, behavioral, and emotional involvement was found to positively correlate with the usage of structured feedback in online classrooms. Together, these several studies offer insightful information on the complex factors affecting students' perceptions of business statistics.

Value is centered on how students view the applicability of business statistics to their future employment and how this understanding shapes their attitudes. Suanpang et al. (2004) found that students learning online and those in traditional settings had significantly different views regarding statistics. Zanakis and Valenzi (1997) noted a range of attitudes and linked a lower level of optimism to increased worry. Using SATS, Ashaari et al. (2011) found that Malaysian pupils had overwhelmingly favorable opinions. According to Ramirez et al. (2012), attitudes are crucial in statistics classes. Nguyen et al. (2016) emphasized the significance of students' opinions on the integration of subjects, finding a strong correlation between attitude and academic performance that accounts for about 40% of the variation and the learning environment for 29% of it. When taken as a whole, these studies provide insightful information about the complex relationship between students' attitudes and their perceptions of the value of business statistics, which has important ramifications for statistics education.

To gather students' subjective assessments of the subject's difficulty and comprehend how these views affect overall attitudes, the study's definition of difficulty evaluates the perceived complexity and problems involved with learning business statistics. To shed light on effective teaching strategies, Zanakis and Valenzi (1997) investigated variables impacting students' perceptions and experiences when learning business statistics, with a particular emphasis on anxiety and attitudes. In his analysis of how statistics are taught and learned, Mills (2004) identified important factors that affect students' attitudes. These factors include gender, confidence, experience with statistics, and aptitude in mathematics. Depaolo and Mclaren (2006) found that attitudes have a major impact on performance in statistics, even for talented students, highlighting the significance of addressing and enhancing attitudes.

Mahmud (2010) suggested that learner profiles may be consistently separated based on attitude dimensions by using discriminant analysis to characterize learners with positive and negative attitudes toward statistics. In a business statistics course, Mokhele (2018) investigated the relationship between statistics anxiety, attitude, and performance. This research provided insights into possible anxiety-reduction strategies. According to Kuzma et al. (2015), there are similarities in the views of students towards traditional and online classes across all fields. Mitra (2023) examined relationships between direct and indirect assessment outcomes with an emphasis on how students acquire topics related to business statistics. Mensah et al. (2023) investigated the correlations and mediators between research anxiety, positive attitudes toward research, self-efficacy, and academic effort among Ghanaian technical university students from the perspective of social cognitive theory. Together, these studies help to clarify the complex relationship that exists between students' attitudes toward business statistics and their perception of the difficulty of the subject, providing insight into useful teaching techniques and possible interventions.

Students' effort is defined as the time, effort, and commitment they put into understanding business statistics and trying to figure out how their active participation corresponds to their thoughts about the subject. Over 2200 students in post-secondary basic statistics classes had their views studied by Schau and Emmioğlu (2012), who found that attitudes fluctuated at the beginning of the course and either stabilized or decreased over time. According to Hsu et al. (2009), an investigation into the variables influencing the adoption of statistical software among online MBA students, computer attitude, and software self-efficacy has a favorable impact on perceived usefulness. Curran and Rosen (2006) emphasized the significance of a healthy learning environment and active student engagement when highlighting course characteristics that affect students' opinions.

According to Bratianu et al. (2020), students are highly conscious of the need for a paradigm change in business education. The issues faced by students and educators were addressed by Darmayanti et al. (2023), who focused on ways to enhance the learning environment, actively inspire students, and assist teachers through training and assessments. When taken as a whole, these studies shed light on the complex relationship that exists between students' views regarding business statistics and the amount of effort they put in, which may be used to inform effective teaching methods and interventions. Using knowledge from a wide range of research, the study seeks to fully comprehend the complex relationships between these variables, illuminating useful instructional strategies and possible interventions to improve students' business statistics learning experiences. The framework consists of the following elements:
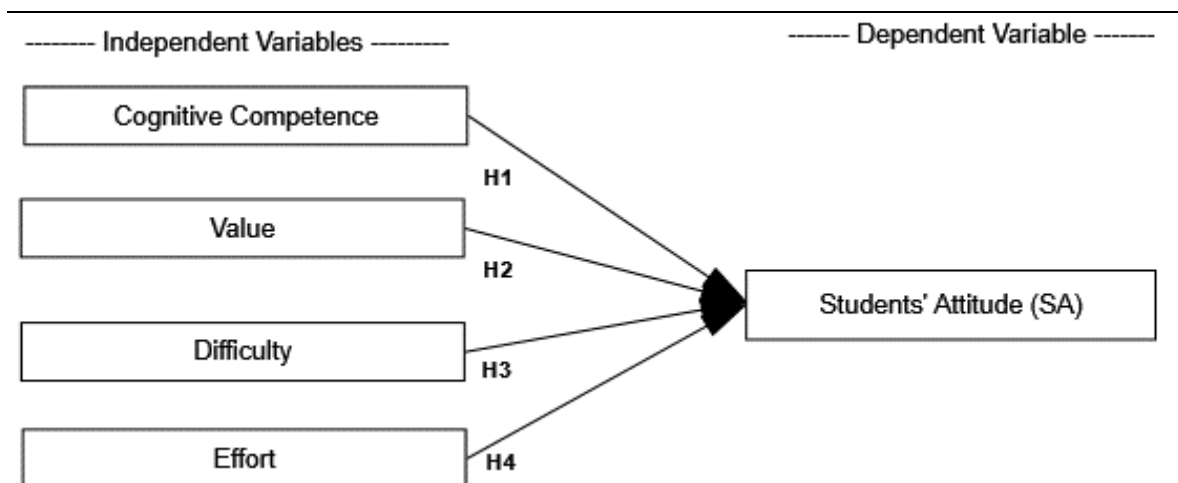
Figure 1 Theoretical Framework

In this study, the following hypotheses are proposed to examine the relationships between the variables:

H1:   Cognitive competence has a significant effect on students' attitudes toward business statistics classes.

H2:   Value has a significant effect on students' attitudes toward business statistics classes.

H3:   There is a significant effect of difficulty on students' attitudes toward business statistics classes.

H4:   There is a significant effect of effort on students' attitudes toward business statistics classes.

3. Methodology

The research design employed for this study is a combination of descriptive and causal-comparative research design. These two approaches are chosen to provide a comprehensive understanding of the attitudes of undergraduate students toward business statistics, considering various factors and potential causal relationships. The research design enables the collection of numerical data, allowing for statistical analysis and interpretation. The study's total population consists of all undergraduate students who are studying business statistics at Shanker Dev Campus, Tribhuvan University in the year 2023. To provide a strong and representative sample, a meticulous selection process yielded a sample size of 328 respondents based on a convenient sampling approach.

The main method used in this study to gather primary data was structured questionnaires. The process of gathering data involved approaching the selected participants in the course of their classrooms. A form outlining the goal of the study and guaranteeing the confidentiality of their

answers was given to each participant. Regarding the information they submitted, participants were assured of their privacy and anonymity. The surveys were distributed, and participants were given enough time to complete them after their consent was obtained. The participants' completed questionnaires were picked up from them the same day or at a later time that was mutually agreed upon. To provide thorough insights into the elements influencing undergraduate students' opinions about business statistics, the questionnaire is carefully divided into two groups. Participants in Group A, which focuses on Personal Information/General Information, are asked to submit demographic information, such as age and gender, to help put the study sample in context. The main focus of the study is Group B, where participants answer questions meant to examine several aspects. A series of thoughtfully constructed items are used to evaluate each of the following: Cognitive Competence (Q1 to Q6), Value (Q7 to Q12), Difficulty (Q13 to Q17), Effort (Q18 to Q23), and Students' Attitude (Q24 to Q29). This systematic approach guarantees a subtle analysis of the cognitive and affective aspects, providing a thorough grasp of the elements impacting students' perceptions of business statistics.

The relevant statistical techniques were employed to analyze the gathered data and utilized descriptive statistics, including means, frequencies, percentages, and standard deviations, to compile the demographic information and questionnaire responses. Validity and inferential statistics, such as regression analysis and correlation, were used in the study. Data analysis is done using statistical software, such as SPSS (Statistical Package for the Social Sciences).

The econometric model of this study was specified as follows:

Students Attitude $(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$

Where,

X_1 = Cognitive Competence; X_2 = Value; X_3 = Difficulty; X_4 = Effort; e = error term

Respondents' Information

For information on participant demographics and important viewpoints, the respondent information section—labelled personal information/general information—is essential. Addressing age, gender, and questions about how business statistics knowledge and perceived difficulty affect attitudes, this part provides an essential contextual framework for the analysis that follows. It seeks to thoroughly investigate the variables influencing participants' viewpoints and experiences in the field of business statistics.

Table 1
Respondents

	Nos	%		Nos	%
Gender			*Have you found that your understanding of business statistics concepts positively influences your attitude toward the subject?*		
Female	202	61.6	Yes	286	87.2
Male	126	38.4	No	42	12.8
Age group			*Is the perceived difficulty of business statistics affecting your overall attitude toward the subject?*		
20 years and below	179	54.6	Yes	274	83.5
21 years and above	149	45.4	No	54	16.5
Total of each section	328	100.0	Total of each section	328	100.0

Table 1 provides a thorough summary of the demographics of the respondents as well as their opinions regarding the correlation between their general attitude toward the subject and their comprehension of business statistics principles. When it came to the gender distribution of the respondents, females made up 61.6% of the sample, while male students made up 38.4%. Regarding the effect of comprehending business statistics concepts on attitude, a noteworthy percentage (87.2%) of respondents—61.6% of whom were male and 38.4% of whom were female—affirmed a positive influence. In terms of age categories, those who were 21 years of age or older made up 45.4% and those who were 20 years and below made up 54.6%. When asked if the perceived difficulty of business statistics affected their attitude overall, 83.5 percent of respondents said it did. The respondent pool's diversity in terms of gender and age is highlighted in Table 1, which also highlights the different viewpoints that respondents had regarding the interaction between knowledge, challenge, and attitude toward business statistics.

Reliability Test
A reliability test was performed on the variables examined in the study. Cronbach's alpha coefficient is utilized to assess the reliability of each variable, indicating the internal consistency or dependability of the items inside each variable.

Table 2

Reliability Test

Dimensions	Items	Cronbach Alpha
Cognitive Competence	6	0.745
Value	6	0.682
Difficulty	5	0.794
Effort	6	0.689
Students Attitude	6	0.633
Total	29	0.929

Table 2 provides insights into the reliability test of the questionnaire, offering a robust assessment of the measurement instrument's effectiveness. The dimensions under scrutiny include Cognitive Competence, Value, Difficulty, Effort, and Students' Attitude, each comprising a specific number of items. The Cronbach Alpha coefficients, which measure internal consistency, are reported for each dimension. Cognitive competence demonstrates strong reliability with a Cronbach Alpha of 0.745, while the value exhibits moderate reliability at 0.682. Difficulty presents a high level of reliability with a Cronbach Alpha of 0.794, and effort displays moderate reliability at 0.689. Students' Attitude dimension, while somewhat lower, still maintains acceptable reliability at 0.633. The overall questionnaire, encompassing all dimensions and items, demonstrates a very high level of internal consistency with a Cronbach Alpha of 0.929, surpassing the recommended threshold of 0.70 by Taber (2018).

4. Presentation and Analysis

The study's analysis focuses on the relationships that exist between the independent variables—Cognitive Competence, Value, Difficulty, and Effort—and the dependent variable, Students' Attitudes. The analysis also looks into Model Summary insights, which provide insight into the model's ability to anticipate. In addition, the research closely examines the Coefficients obtained from the regression analysis, revealing the complex interrelationships among the variables. By exposing the complex processes affecting students' perceptions of business statistics, this investigation hopes to stimulate a conversation about the significance of the correlations and coefficients found.

Table 3

Correlations Between the Dependent Variable and Independent Variables

		CC	Value	Difficulty	Effort	SA
	CC	1				
	Value	.760**	1			
Pearson	Difficulty	.753**	.770**	1		
Correlation	Effort	.862**	.785**	.710**	1	
	SA	.827**	.712**	.606**	.795**	1

**. Correlation is significant at the 0.01 level (2-tailed).

The relationships between the independent variables, Cognitive Competence (CC), Value, Difficulty, and Effort, and the dependent variable, Students' Attitude (SA), are displayed in Table 3. The Pearson Correlation coefficients show the direction and strength of these correlations. Interestingly, there is a significant positive link between SA and Cognitive Competence, indicating that attitudes toward business statistics are more favorable when cognitive competence is higher. Value and effort likewise show strong positive connections with SA, highlighting the influence of putting forth effort and judging value on cultivating positive attitudes. On the other hand, difficulty shows a positive association with SA, suggesting that attitudes regarding business statistics grow less positive as perceived difficulty rises. The statistical significance of all correlations at the 0.01 level confirms the validity of these relationships. This comprehensive understanding of the components influencing attitudes toward business statistics is made possible by the detailed understanding of the interactions between students' attitudes and cognitive competency, value, difficulty, and effort.

Table 4

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.851	.724	.721	.3387	.724	212.24	4	323	.000

Regression analysis's Model Summary is shown in Table 4 and provides information on the model's ability to predict SA based on four predictors: effort, difficulty, value, and cognitive competence. The combined impact of these variables accounts for almost 72.4% of the variability in students' attitudes, as indicated by the coefficient of determination (R Square) of 0.724. With the number of predictors taken into consideration, the Adjusted R Square stays high at 0.721. The estimate's standard error is .3387, demonstrating the precision of the forecasts. The model's overall explanatory ability is reinforced by the statistically significant result (p <.001) of F Change of 212.24, which is reported in the Change Statistics section. To put it simply, the result offers a thorough summary of how well the regression model performed in predicting students' attitudes based on the given predictors.

Table 5

Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
(Constant)	.670	.105		6.412	.000	.465	.876		
CC	.523	.057	.581	9.210	.000	.411	.635	.215	4.658
Value	.189	.053	.195	3.594	.000	.086	.293	.290	3.447
Difficulty	-.136	.042	-.163	-3.257	.001	-.218	-.054	.341	2.936
Effort	.233	.057	.257	4.092	.000	.121	.346	.217	4.612

a. Dependent Variable: Students' Attitude

The regression analysis's coefficients, which are displayed in Table 5, provide information on the link between the dependent variable, students' attitude, and the independent variables, cognitive competence (CC, value, difficulty, and effort). The change in the dependent variable corresponding to a one-unit change in the corresponding independent variable is represented by the unstandardized coefficients. A measurement of each predictor's distinct contribution in terms of standard deviations is given by the Standardized Coefficients (Beta). Interestingly, there is a significant positive influence for CC (Beta = 0.581, p <.001), suggesting that more positive attitudes are associated with greater levels of cognitive competence. Value and effort, with standardized coefficients of 0.195 and 0.257, respectively, also favorably influence students' attitudes.

On the other hand, difficulty has a negative effect (Beta = -0.163, p =.001), indicating that views grow less positive as perceived difficulty rises. Each coefficient has statistical significance (p <.001), thereby confirming the strength of these correlations. The Collinearity Statistics section gives statistics on tolerance and variance inflation factor (VIF), demonstrating acceptable levels of multicollinearity among the predictors. In conclusion, Table 5 clarifies the precise roles played by each independent variable in the attitude prediction of students. It offers vital information about the elements affecting students' perceptions of business statistics. The regression analysis's coefficients provide a detailed knowledge of how students' attitudes are impacted by factors such as cognitive competence, value, difficulty, and effort. The correlation between students' attitudes and cognitive competence is positive and significant, indicating that providing students with a solid grounding in statistical concepts has a favorable impact on their attitudes in general. Comparably, Value and Effort's beneficial contributions show that highlighting the usefulness of business statistics in real-world contexts and promoting student participation can improve attitudes.

Discussion

TRA places a strong emphasis on the influence of attitudes, perceived behavioral control, and subjective standards on intentions and behaviors. To clarify how social norms and perceived value related to learning business statistics affect students' attitudes, TRA is used in this study (Hale et al., 2002). According to the Expectancy-Value Theory, attitudes and motivation are influenced by both the perceived value of a task and expectations of achievement (Dahal, 2021; Loh, 2019; Shahi et al., 2023). This theory helps explain the influence of students' cognitive skills and the perceived value of business statistics on their overall attitude. The theory of Cognitive Load, which asserts limitations in information processing, is utilized to comprehend how pupils' attitudes may be impacted by perceived difficulty (Dahal et al., 2023; Schnotz & Kürschner, 2007). The Effort variable is supported by the Effort-Performance Theory, which reveals that students who put in more effort may have more positive attitudes (Muenks & Miele, 2017). All of these theoretical stances together offer a thorough basis for delving into the complex interactions between important factors in the context of students' perceptions of

business statistics. Numerous research studies that are compatible with the investigated dimensions of cognitive competence, value, difficulty, and effort lend support to the current findings by offering insights into the elements affecting undergraduate students' views about business statistics. In support of the current findings on cognitive competence, Duque Jr. and Tan's (2018) study, for example, found a positive association between performance and confidence in one's ability to acquire mathematics. In line with the value dimension, research by Ashaari et al. (2011), Ramirez et al. (2012), and Zanakis and Valenzi (1997) highlight the importance of attitudes and perceptions in statistics courses. According to the theoretical framework, all of this research supports the idea that students' opinions are shaped by how much they respect business data.

Studies by Depaolo and Mclaren (2006), Kuzma et al. (2015), Mahmud (2010), Mills (2004), Mokhele (2018), and Zanakis and Valenzi (1997) provide support for the current findings with regard to the dimension of difficulty. These studies examine the complex relationship between students' attitudes about business statistics and their perceptions of its difficulty, highlighting the necessity to address and change attitudes even among academically talented students. The current data support the idea that perceived difficulty plays a major role in determining views. Bratianu et al. (2020), Carlson and Winquist (2011), Curran and Rosen (2006), Darmayanti et al. (2023), Hsu et al. (2009), and Schau and Emmioğlu (2012), all offer consistent evidence in the field of effort. All of this research points to the significance of student participation, effort, and supportive learning settings in forming attitudes about business statistics. The results are consistent with the Effort-Performance Theory, which postulates that students who put in more effort might have more favorable sentiments regarding the subject. The studied literature has little information that directly contradicts or questions the investigated features, which stands in contrast to the current findings. Subtle discrepancies in findings may arise from variances in study circumstances, methodology, and participant demographics. For example, whereas Suanpang et al. (2004) study highlights attitudes that differ in online and traditional settings, the specifics of these variations and how they affect attitudes might not be directly transferable to the current study. Additionally, the research by Mitra (2023) focusing on how students learn business statistics ideas may include variables not explicitly addressed in the present study, resulting in variances in outcomes.

5. Conclusion

In conclusion, this study dug into the subtle dynamics impacting undergraduate students' views toward business statistics, drawing upon theoretical frameworks such as the Theory of Reasoned Action (TRA), Expectancy-Value Theory, Cognitive Load Theory, and Effort-Performance Theory. The study investigated important characteristics, such as Cognitive Competence, Value, Difficulty, and Effort, through a thorough literature review and empirical research to identify the variables influencing students' attitudes in this crucial educational area. The impact of these factors on students' views was found to have consistent support in the literature and empirical outcomes. Students' cognitive competence, which measures their mental aptitude for understanding statistical ideas, showed relationships with anxiety,

confidence, and metacognitive processes. Students' opinions were consistently influenced by the Value dimension, which highlighted the perceived relevance of business statistics to future jobs. This aligns with theoretical concepts and empirical data from many research. Numerous research studies have shown how perceived difficulty affects attitudes, making it clear that customized interventions are necessary to address problems and enhance perceptions in general. As a result, perceived difficulty has emerged as a crucial element.

One important factor that demonstrated the positive correlation between students' attitudes toward business statistics and their active engagement was effort. Research has continuously validated the Effort-Performance Theory, showing that students who work harder generally have more positive attitudes. This highlights the significance of creating a supportive learning environment and motivating students' commitment. Although the literature review offered insightful analysis from various angles, the empirical results enhanced comprehension of these features within the particular context of the research population. By combining theoretical underpinnings with empirical data, the study adds to the body of information already in existence by providing a thorough understanding of the various aspects affecting students' attitudes regarding business statistics. In essence, the study not only validates the significance of Cognitive Competence, Value, Difficulty, and Effort but also underlines the need for individualized instructional tactics and interventions. Comprehending these processes is essential for instructors, legislators, and organizations to improve statistics education standards and maximize students' educational opportunities. To improve students' attitudes and create a productive learning environment in the subject of business statistics, the findings offer a useful road map for future study and interventions.

6. Suggestions for Future Research

Future business statistics education studies could use a range of methods to improve understanding and knowledge. First, longitudinal research can reveal how educational practices and interventions affect students' attitudes over time. Researchers can better understand dynamics by tracking attitude changes over time. Second, studying cross-cultural influences on students' views of business statistics could be crucial. Cultural differences shape attitudes, and cross-cultural research may reveal obstacles and effective teaching strategies for varied student populations. This approach recognizes the importance of cultural context in devising teaching tactics that appeal to diverse students. As digital learning environments grow more common, students' attitudes regarding business statistics should be studied. Online and hybrid learning platforms could be tested using virtual simulations and adaptive technology. Understanding how technology shapes attitudes is essential to tailoring education to modern learning styles. Comparative studies of teaching methods are another possibility. Comparing traditional classroom methods to innovative ones like flipped classrooms or project-based learning may reveal the best strategies to engage students and improve business statistics attitudes.

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