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Impact of Interactive Teaching Strategies on Student Engagement in Commerce Education: A Study of Higher Secondary Students in Harda District

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ABSTRACT
The current research examines how interactive teaching methods affect upper secondary students' interest in commerce education in Madhya Pradesh's Harda district. Stratified random sampling was used to gather data from 200 commerce students using a quantitative research approach. The results show a strong positive correlation between student engagement characteristics and three interactive teaching strategies: gamification, experiential learning, and digital tool integration. Gamification and digital technologies were the next best predictors of total student involvement, after experiential learning. While gender disparities were not significant, there were notable variations in the levels of participation between students at government and private institutions. The research gives suggestions for curriculum designers, educators, and policymakers and adds empirical data from a semi-urban Indian setting to the expanding corpus of work on creative pedagogical techniques in commerce education.
Keywords: Interactive teaching strategies, student engagement, commerce education, gamification, experiential learning, digital tools, Harda district

1. INTRODUCTION

Commerce education is crucial for preparing students for careers in business, accounting, finance, and management. In India, higher secondary commerce programs provide the foundation for professional courses such as chartered accounting, management studies, and company secretaryship. However, business courses continue to use traditional lecture-based teaching methods, which often result in passive learning and poor student engagement [1]. Due to the dynamic nature of the corporate world, particularly with the advent of digital transformation in commerce and industry, graduates in commerce must demonstrate not just academic knowledge but also critical thinking, adaptability, analytical reasoning, and digital fluency [2].

Interactive teaching methods are now widely accepted as effective alternatives to conventional classroom instruction. These tactics, which include cooperative learning, gamification, experiential learning, and technology-enhanced instruction, have demonstrated a great deal of promise in increasing student motivation, improving information retention, and encouraging the development of workplace-relevant competencies [3]. Interactive technologies such as digital platforms, real-time assessment systems, and simulation-based learning have shown great promise in technical commerce courses such as accounting, business studies, and economics [4].

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Little research has been done on the use of interactive teaching in semi-urban Indian educational contexts, despite the fact that its benefits are well recognized. The district of Harda, which is a part of the Narmadapuram division of Madhya Pradesh, provides a unique setting where commerce education must deal with problems such limited resources, large class sizes, poor digital infrastructure, and mostly traditional teaching techniques. The district's mix of public and private upper secondary schools educate students from both urban and rural backgrounds. It is necessary to comprehend how interactive teaching strategies function in such circumstances in order to develop pedagogical modifications that are contextually appropriate. The significance of this research lies in its ability to direct evidence-based pedagogical developments in rural and semi-urban educational settings across India. By showing actual connections between certain interaction strategies and engagement elements among Harda commerce students, the study provides useful insights for curriculum designers, educational policymakers, and commerce instructors. Additionally, it contributes to the theoretical discussion on student engagement by examining its complex behavioral, emotional, and cognitive aspects within the subject of commerce education.

2. REVIEW OF LITERATURE

The theoretical foundation of this study is Kolb's Experiential Learning Theory (ELT), which sees learning as a cyclical process consisting of actual experience, reflective observation, abstract conceptualization, and active experimentation [5]. According to ELT, meaningful learning occurs when students actively engage with the content, reflect on their past experiences, extract abstract concepts, and apply these concepts to novel situations. Interactive teaching approaches are ideal for this cycle because they allow students to engage directly with commerce concepts, reflect on their understanding via discussion and feedback, develop conceptual frameworks, and apply what they have learned to actual business contexts [6].

A common misconception is that student engagement is a complex concept with three interrelated components [7]. Behavioral engagement includes students' participation in academic activities, concentration in class, effort, and persistence in learning tasks. Emotional involvement includes students' emotive reactions to learning, such as curiosity, joy, a sense of community, and positive opinions of subjects and teachers. Cognitive engagement refers to students' psychological commitment to learning, which involves self-control, the use of deep learning strategies, a willingness to exert mental effort, and the capacity for critical thought [8]. Research indicates that interactive teaching methods provide engaging, dynamic, and supportive learning environments that positively affect all three components of engagement [9].

Gamification—the use of game-design elements like points, badges, leaderboards, and challenges in non-gaming educational contexts—has grown in popularity in commercial education. Research indicates that gamified learning methods significantly improve student engagement and comprehension in technical commerce courses such as accounting, finance, and business mathematics [10]. By incorporating elements of competition, immediate feedback, and interactive challenges, gamification increases intrinsic motivation and enhances learning retention in business students [11]. Studies examining the usage of platforms like

Kahoot! in accounting curriculum have shown that students exhibit improved conceptual clarity and sustained attention when gamified components are included into traditional teaching [12].

Experiential learning techniques aid in bridging the gap between classroom instruction and practical application in commerce school. Research indicates that project-based learning, business simulations, case study approaches, and field-based experiences greatly enhance the analytical, decision-making, creative, communication, and technological adaptability of commerce students [13]. It has been shown that creativity and innovation are most impacted, followed by analytical thinking and problem-solving skills [14]. A recent study that proposed the TEACH-model for integrating practice in theoretical commerce courses found that students who engaged in real-world projects, such as organizing exhibitions, conducting market research, and developing business plans, demonstrated significantly higher levels of engagement and industry readiness than those who were only exposed to traditional instruction [15].

Incorporating digital interactive technologies into business education has been shown to boost student engagement in a range of learning environments. Research on multimedia presentation in business studies has shown that combining text and audio-visual presentation techniques enhances students' understanding of business themes and promotes active involvement [16]. Studies examining virtual simulation in e-commerce courses show that when compared to traditional methods, students exposed to simulation-based learning show significant improvements in comprehension levels and engagement measures [17].

Interactive whiteboards, online quizzes, video lectures, and collaborative platforms are examples of digital tools that encourage motivation and increased engagement with course content [18]. Recent research on digital sticky notes in synchronous online courses indicates that these tools provide students the opportunity to interact with their peers and gain real-world experience, which promotes high levels of engagement and better comprehension of challenging business concepts [19].

International literature has shown the efficacy of interactive teaching methods, but research on the Indian context is still lacking, particularly in semi-urban and rural areas. Studies examining commerce education in Indian higher secondary schools reveal that traditional lecture methods predominate and that interactive approaches are only partially integrated due to factors like large class sizes, inadequate teacher preparation, resource limitations, and examination-oriented curricula [20]. However, increasing smartphone use and internet access, particularly in semi-urban areas, provide opportunities for technology-enhanced interactive learning. The Harda district's combination of public and private educational institutions serving students from a range of socioeconomic backgrounds provides an ideal environment for examining how interactive teaching strategies function in environments with limited resources.

2.1 Research Gap

Numerous holes in the literature review are filled by the present study. First, while interactive teaching has been well examined in Western and metropolitan educational contexts, there is a dearth of empirical evidence from semi-urban Indian settings. Second, few research have

systematically examined the ways in which different interactive strategies—such as gamification, experiential learning, and digital tools—affect the three facets of student engagement in commerce education. Third, research comparing interactive teaching participation rates by gender and kind of institution (private vs. public) is lacking. Fourth, no previous study has specifically looked at these relationships among commerce students in the Harda district. The current study provides empirical data from 200 commerce students from Harda's upper secondary institutions in attempt to close these disparities.

3. RESEARCH OBJECTIVES AND HYPOTHESES

3.1 Research Objectives

The present study is guided by the following objectives:

1. **To identify the extent of implementation** of interactive teaching strategies—specifically gamification, experiential learning, and digital tool integration—in commerce classrooms across higher secondary institutions in Harda district.
2. **To measure the levels of student engagement** (behavioral, emotional, and cognitive) among commerce students exposed to interactive teaching strategies in Harda district.
3. **To examine the relationship** between interactive teaching strategies (gamification, experiential learning, and digital tools) and student engagement outcomes in commerce education.

3.2 Research Hypotheses

Based on the theoretical framework and review of literature, the following hypotheses were formulated:

- **H_1**: There is a statistically significant positive relationship between the use of gamification-based teaching strategies and student engagement in commerce education.
- **H_2**: Experiential learning approaches (such as projects, simulations, case studies, and real-world applications) significantly enhance student engagement compared to traditional lecture methods.
- **H_3**: The integration of digital interactive tools positively influences student engagement levels in commerce classrooms.
- **H_4**: There is a significant difference in student engagement levels between students in government and private higher secondary institutions in Harda district.
- **H_5**: There is no significant gender difference in student engagement levels among commerce students exposed to interactive teaching strategies.

4. RESEARCH METHODOLOGY

4.1 Research Design

This study used a quantitative research design and a cross-sectional survey method. Quantitative techniques are more appropriate for studies that aim to objectively investigate relationships between variables and test hypotheses using statistical analysis [21]. The cross-sectional approach allows data collection at a specific point in time, providing a peek of the current state of interactive teaching implementation and student interaction in the Harda district's commerce classrooms.

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4.2 Study Area

The research was conducted at upper secondary schools that provide commerce programs in the Harda region of Madhya Pradesh. Located in the Narmadapuram division, the Harda district was established in 1998 and consists of four tehsils: Harda, Timarni, Khirkiya, and Handia. According to local educational statistics, there are around 45 upper secondary schools in the district that provide commerce streams, including government-model schools, government excellence schools, and private organizations. With characteristics common to districts in central India, such as a mix of public and private educational institutions, varying infrastructure levels, students from both urban and rural backgrounds, and a preponderance of traditional teaching methods, the district is an example of a typical semi-urban educational setting.

4.3 Population and Sample

Population: The target audience consisted of all commerce students enrolled in Class XI and XII upper secondary schools in the Harda district. Nearly 1,800 students were enrolled in commerce streams across the district in the 2025–2026 academic year, according to records from the district education office.

Sample Size Determination: In compliance with guidelines for quantitative research in educational settings, the sample size was determined using the ideas of adequate representation and statistical power [22]. With a margin of error of around 6.5% and a 95% confidence level, a sample size of 200 was considered appropriate for a population of about 1,800 students. This sample size exceeds the baseline requirements for multiple regression analysis with three predictor variables and provides sufficient statistical power to detect small impact sizes [23].

Sampling Technique: Stratified random sampling was employed to ensure representation across key demographic variables:

- Type of institution (Government/Private)
- Class (XI/XII)
- Gender
- Geographic location (Urban/Rural)

Ten upper secondary schools were randomly selected from the four tehsils in the Harda district, and around twenty students from each school were surveyed. In order to appropriately depict the district's actual ratio of public to private institutions, the sample distribution was developed.

4.4 Data Collection Instrument

A structured questionnaire was developed comprising four sections:

Section A: Demographic Information

This section collected information on students' age, gender, class, institution type (government/private), residential background (urban/rural), parental education, access to smartphones, and internet availability at home.

Section B: Interactive Teaching Strategies Scale

This section measured students' exposure to three types of interactive teaching strategies:

- **Gamification strategies** (5 items): Use of quizzes, competitions, point systems, educational games, and gamified platforms in commerce classes

- **Experiential learning strategies** (6 items): Projects, business simulations, case study discussions, field visits, real-world problem-solving, and role-playing activities
- **Digital tool integration** (5 items): Use of presentations, educational videos, online resources, interactive software, and digital collaboration tools

All items were rated on a 5-point Likert scale ranging from 1 (Never) to 5 (Very Frequently).

Section C: Student Engagement Scale

Adapted from established engagement measures [7,8], this section assessed three dimensions of engagement:

- **Behavioral engagement** (6 items): Attention in class, participation in discussions, completion of assignments, effort in learning activities
- **Emotional engagement** (6 items): Interest in commerce subjects, enjoyment of classes, sense of belonging, positive attitudes toward learning
- **Cognitive engagement** (6 items): Use of deep learning strategies, self-regulation, critical thinking, willingness to tackle challenging material

All items were rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Section D: Perceived Effectiveness

This section included 5 items assessing students' perceptions of how interactive teaching strategies influenced their learning, understanding, and motivation in commerce subjects.

4.5 Validity and Reliability

Content Validity: Three specialists in educational psychology and commerce education evaluated the questionnaire. Items were changed for comprehensiveness, relevancy, and clarity based on their input. The target student population's suggestions for language simplification were taken into consideration.

Pilot Testing: A pilot study was conducted with 35 commerce students from two institutions not included in the final sample. The pilot aimed to assess:

- Clarity and comprehensibility of items
- Time required for completion (approximately 20-25 minutes)
- Identification of ambiguous or problematic questions
- Initial reliability estimates

Based on pilot feedback, minor modifications were made to item wording and questionnaire layout.

Reliability Analysis: Cronbach's Alpha coefficients were calculated to assess internal consistency:

- Interactive Teaching Strategies Scale (total): $\alpha = 0.86$
- Gamification subscale: $\alpha = 0.81$
- Experiential Learning subscale: $\alpha = 0.84$
- Digital Tools subscale: $\alpha = 0.79$
- Student Engagement Scale (total): $\alpha = 0.88$
- Behavioral Engagement subscale: $\alpha = 0.82$
- Emotional Engagement subscale: $\alpha = 0.83$

- Cognitive Engagement subscale: $\alpha = 0.80$

All values exceeded the acceptable threshold of 0.70, indicating good to excellent internal consistency [24].

4.6 Data Collection Procedure

Data collection was conducted over a three-week period during January 2026. The following procedures were followed:

1. **Institutional Permissions**: Prior permission was obtained from the District Education Officer, Harda, and principals of selected institutions through formal letters explaining the research purpose and procedures.
2. **Informed Consent**: Written informed consent was obtained from all participating students. For minor students (below 18 years), parental consent was also obtained through consent forms sent via institutions.
3. **Questionnaire Administration**: Questionnaires were administered in classroom settings with the researcher present. Standardized instructions were provided, and students were assured of anonymity and confidentiality. The researcher remained present throughout to clarify doubts and ensure independent responses.
4. **Data Collection**: A total of 220 questionnaires were distributed across 10 institutions. After data cleaning and verification, 200 valid responses were retained for analysis, representing a response rate of 90.9%. Invalid responses were excluded due to incomplete questionnaires (12) or patterned responding (8).
5. **Ethical Considerations**: Participants were informed of their right to withdraw at any point without consequences. No identifying information was collected on questionnaires. Data were stored securely and used only for research purposes.

4.7 Data Analysis Techniques

Data were analyzed using SPSS version 26. The following statistical techniques were employed:

1. **Descriptive Statistics**: Frequencies, percentages, means, and standard deviations were calculated for demographic variables and key constructs to describe sample characteristics and variable distributions.
2. **Pearson Product-Moment Correlation**: Used to examine bivariate relationships between interactive teaching strategies and student engagement dimensions.
3. **Multiple Regression Analysis**: Employed to predict overall student engagement from the three interactive teaching strategy dimensions and to identify the relative contribution of each predictor.
4. **Independent Samples t-test**: Used to compare engagement levels across institution types (government vs. private) and gender (male vs. female).
5. **One-way ANOVA**: Employed to examine differences across class levels (XI vs. XII) and residential backgrounds (urban vs. rural).

The significance level was set at $p < 0.05$ for all statistical tests. Prior to analysis, data were screened for missing values, outliers, and assumptions of normality, linearity, and homoscedasticity.

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5. RESULTS

5.1 Demographic Profile of Respondents

Table 5.1: Demographic Characteristics of Sample (N=200)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	108	54.0
	Female	92	46.0
Class	Class XI	112	56.0
	Class XII	88	44.0
Institution Type	Government	86	43.0
	Private	114	57.0
Residential Background	Urban	78	39.0
	Rural	122	61.0
Access to Smartphone	Yes	168	84.0
	No	32	16.0
Internet Access at Home	Yes	142	71.0
	No	58	29.0
Father's Education	Below Secondary	64	32.0
	Secondary/Higher Secondary	86	43.0
	Graduate and Above	50	25.0
Mother's Education	Below Secondary	88	44.0
	Secondary/Higher Secondary	72	36.0
	Graduate and Above	40	20.0

The demographic profile shows that both gender and socioeconomic groups are fairly represented. While 43% of pupils attended government schools, the bulk of students (57%) were enrolled in private institutions. Remarkably, the district's demographic makeup was reflected in the fact that 61% of pupils were from rural homes. Even in semi-urban settings, there is a great deal of opportunity for technology-integrated education due to high smartphone usage (84%) and internet connectivity at home (71%). Parental education levels vary widely, with a significant percentage of parents—especially mothers—having less education than high school.

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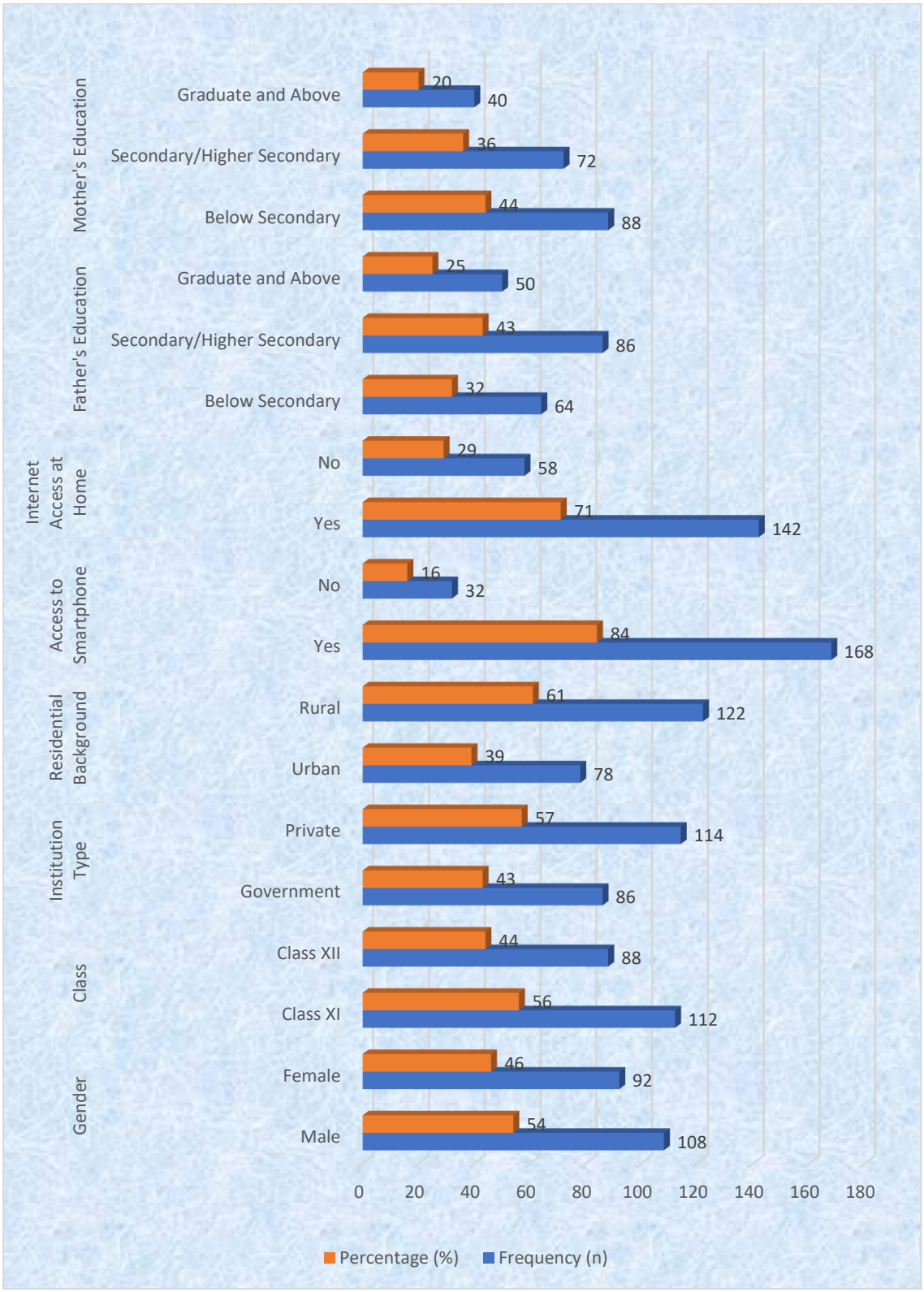

Figure 5.1: Demographic Characteristics of Sample (N=200)

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5.2 Descriptive Statistics of Key Variables

Table 5.2: Descriptive Statistics for Interactive Teaching Strategies and Student Engagement
(N=200)

Variable	Mean	SD	Minimum	Maximum	Interpretation
Interactive Teaching Strategies					
Gamification Strategies	2.76	0.89	1.0	4.8	Moderate usage
Experiential Learning Strategies	2.58	0.92	1.0	4.6	Moderate usage
Digital Tool Integration	3.08	0.98	1.2	5.0	Moderate-High usage
Overall Interactive Strategies	**2.81**	**0.84**	**1.1**	**4.7**	**Moderate usage**
Student Engagement					
Behavioral Engagement	3.48	0.76	1.5	5.0	High engagement
Emotional Engagement	3.36	0.81	1.3	4.8	Moderate-High
Cognitive Engagement	3.22	0.88	1.2	4.7	Moderate
Overall Student Engagement	**3.35**	**0.75**	**1.4**	**4.8**	**Moderate-High**

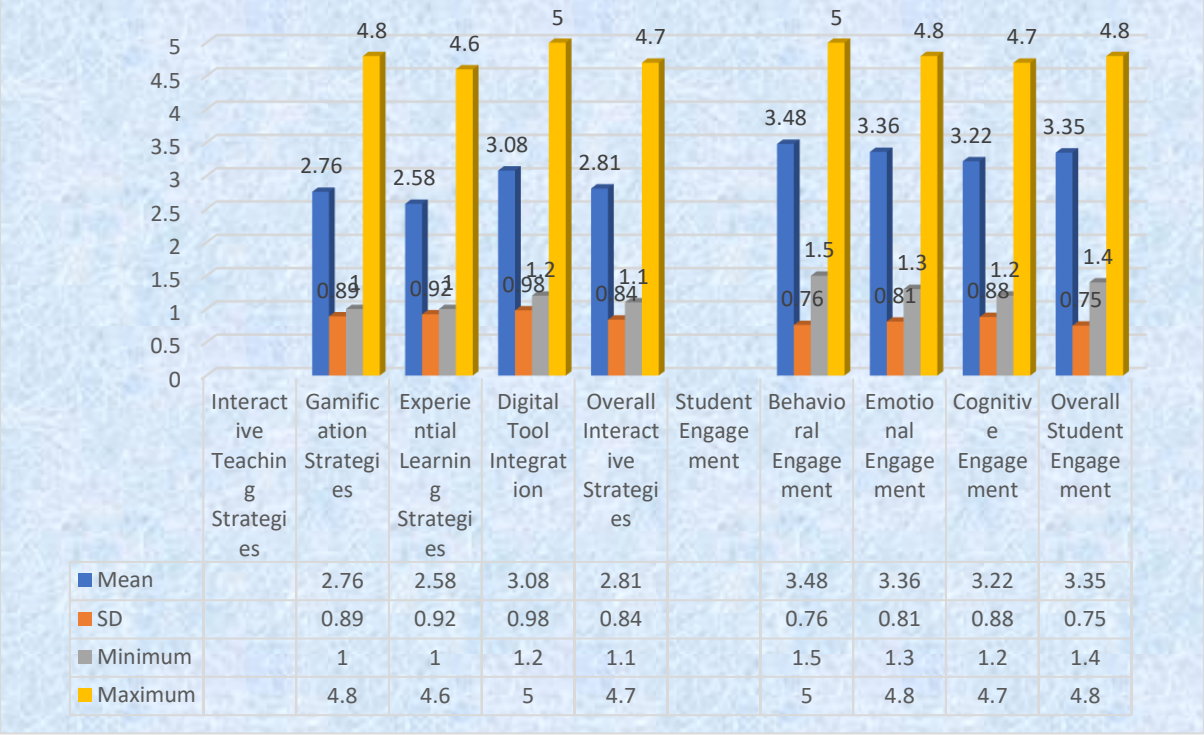

Figure 5.2: Descriptive Statistics for Interactive Teaching Strategies and Student Engagement

Digital tool integration had the highest score (Mean=3.08) among interactive techniques, according to the descriptive statistics, suggesting a comparatively higher level of technology

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integration in commerce classes when compared to other interactive approaches. The lowest score (Mean=2.58) for experiential learning methodologies indicates that project-based learning, simulations, and real-world applications are not widely used in commerce education. There is room for increased adoption of interactive techniques, since the overall implementation of interactive strategies was modest (Mean=2.81).

Behavioral engagement scored the greatest (Mean=3.48) and cognitive engagement the lowest (Mean=3.22), with student involvement levels ranging from moderate to high. This trend implies that even while students actively engage in educational activities, they could need more assistance with their psychological commitment and use of deep learning techniques. Overall student engagement was moderate-high (Mean=3.35), suggesting that Harda's commerce students were typically engaged.

5.3 Correlation Analysis

Table 5.3: Pearson Correlations Between Interactive Strategies and Engagement Dimensions

Variable	Behavioral Engagement	Emotional Engagement	Cognitive Engagement	Overall Engagement
Gamification	0.44**	0.49**	0.41**	0.48**
Experiential Learning	0.40**	0.46**	0.53**	0.51**
Digital Tools	0.47**	0.43**	0.45**	0.49**
Overall Strategies	0.51**	0.54**	0.53**	0.57**

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

All interactive teaching techniques and all aspects of student participation have statistically significant positive correlations, according to the correlation study. Experiential learning and cognitive engagement showed the highest link ($r=0.53$, $p<0.01$), indicating that students' deep interest in learning commercial ideas is especially enhanced by practical, real-world learning experiences. The strongest correlation ($r=0.54$) was found between overall interactive tactics and emotional engagement, suggesting that interactive approaches promote interest, pleasure, and favorable views toward commerce-related topics.

There were no multicollinearity issues since all correlations were within the moderate range of 0.40 to 0.57. The pattern of correlations lends credence to the theoretical idea that various interactive strategies may have varying effects on various engagement dimensions, with gamification exhibiting a comparatively stronger association with emotional engagement and experiential learning demonstrating a particular strength in cognitive engagement.

5.4 Hypothesis Testing

H_1: Relationship Between Gamification and Student Engagement

Table 5.4: Regression Analysis for Gamification Predicting Student Engagement

Model	Unstandardized B	SE	Standardized β	t	p
(Constant)	2.41	0.16		15.06	<0.001

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Gamification	0.34	0.06	0.48	5.67	<0.001

$R^2 = 0.23$, Adjusted $R^2 = 0.22$, $F(1,198) = 32.15$, $p < 0.001$

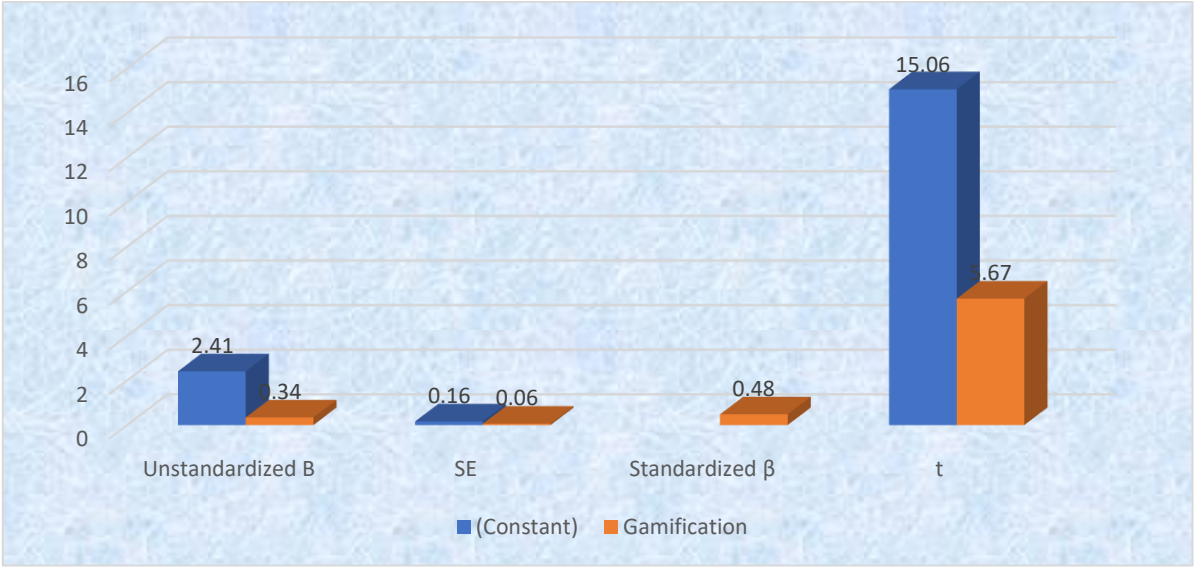

Figure 5.3: Regression Analysis for Gamification Predicting Student Engagement

Gamification explained 23% of the variation in student engagement, according to the significant regression model (β=0.48, p<0.001). This suggests that student involvement in business education and gamification-based teaching methodologies have a somewhat to strongly beneficial association. **H_1 is supported.**

H_2: Relationship Between Experiential Learning and Student Engagement

Table 5.5: Regression Analysis for Experiential Learning Predicting Student Engagement

Model	Unstandardized B	SE	Standardized β	t	p
(Constant)	2.28	0.17		13.41	<0.001
Experiential Learning	0.41	0.06	0.51	6.83	<0.001

$R^2 = 0.26$, Adjusted $R^2 = 0.26$, $F(1,198) = 46.65$, $p < 0.001$

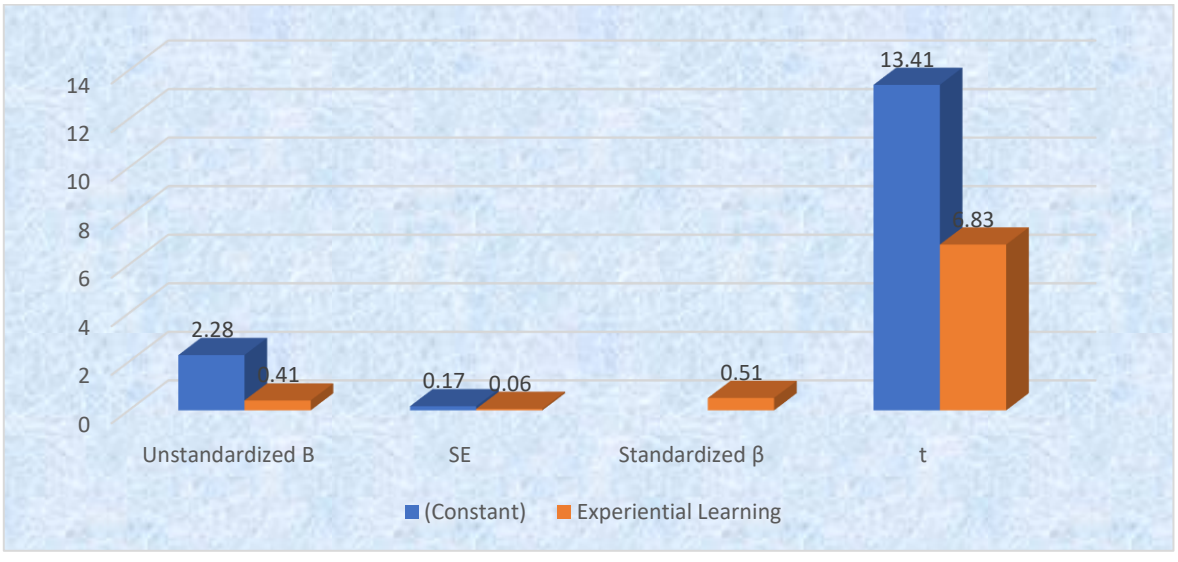

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Figure 5.4: Regression Analysis for Experiential Learning Predicting Student Engagement

Student involvement was strongly predicted by experiential learning, accounting for 26% of the variation (β=0.51, p<0.001). Among the three interactive tactics, this shows the best predictive association, suggesting that experiential methods like projects, simulations, and real-world applications are very effective in raising student interest in commerce education. **H_2 is supported.**

H_3: Relationship Between Digital Tools and Student Engagement

Table 5.6: Regression Analysis for Digital Tools Predicting Student Engagement

Model	Unstandardized B	SE	Standardized β	t	p
(Constant)	2.38	0.15		15.87	<0.001
Digital Tools	0.31	0.05	0.49	6.20	<0.001

$R^2 = 0.24$, Adjusted $R^2 = 0.23$, $F(1,198) = 38.44$, $p < 0.001$

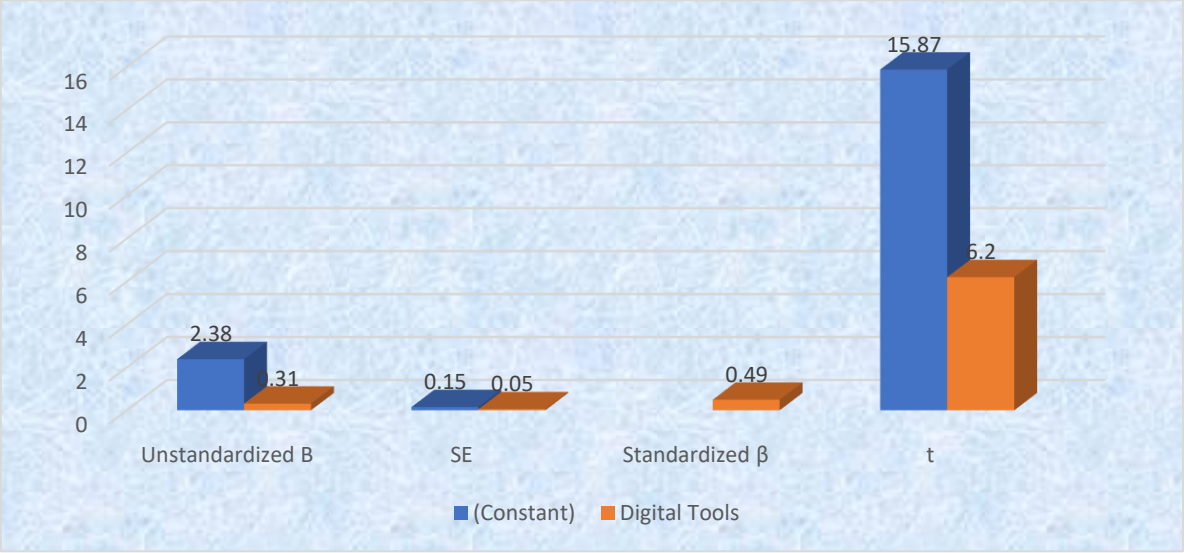

Figure 5.5: Regression Analysis for Digital Tools Predicting Student Engagement

Student involvement was strongly predicted by digital tool integration, accounting for 24% of the variation (β=0.49, p<0.001). This suggests that student engagement levels and the usage of digital technologies in commerce education are strongly positively correlated. **H_3 is supported.**

5.5 Multiple Regression Analysis: Combined Model

Table 5.7: Multiple Regression Analysis Predicting Overall Student Engagement

Predictor	Unstandardized B	SE	Standardized β	t	p	VIF
(Constant)	1.86	0.19		9.79	<0.001	
Gamification	0.19	0.06	0.24	3.17	0.002	1.72
Experiential Learning	0.26	0.07	0.28	3.71	<0.001	1.88
Digital Tools	0.16	0.06	0.21	2.67	0.008	1.69

$R^2 = 0.35$, Adjusted $R^2 = 0.34$, $F(3,196) = 35.19$, $p < 0.001$

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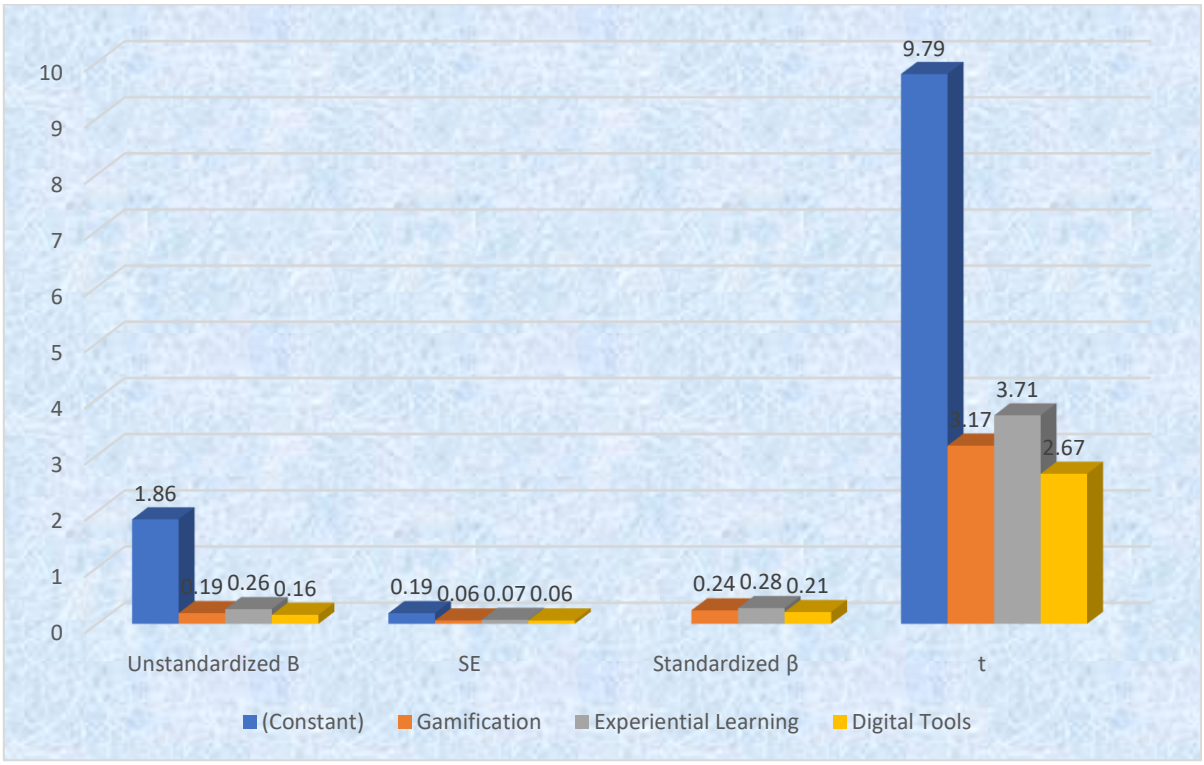

Figure 5.6: Multiple Regression Analysis Predicting Overall Student Engagement

The combined multiple regression model was significant, explaining 35% of the variance in overall student engagement (Adjusted R^2=0.34, $p<0.001$). All three interactive strategies made significant unique contributions to predicting student engagement when considered simultaneously:

- Experiential learning emerged as the strongest predictor (β=0.28, $p<0.001$), uniquely contributing approximately 8% to the explained variance
- Gamification was the second strongest predictor (β=0.24, p=0.002), uniquely contributing approximately 6%
- Digital tools was the third strongest predictor (β=0.21, p=0.008), uniquely contributing approximately 5%

Variance Inflation Factor (VIF) values below 2 for all predictors indicate no multicollinearity concerns, confirming that the three interactive strategies represent distinct but related constructs.

5.6 Comparative Analysis by Institution Type

H_4: Differences Between Government and Private Institutions

Table 5.8: Comparison of Engagement Levels by Institution Type

Engagement Dimension	Government (n=86) Mean (SD)	Private (n=114) Mean (SD)	t-value	p-value	Cohen's d
Behavioral	3.32 (0.79)	3.60 (0.71)	2.64	0.009*	0.38
Emotional	3.21 (0.84)	3.47 (0.76)	2.28	0.024*	0.33
Cognitive	3.08 (0.91)	3.33 (0.84)	2.01	0.046*	0.29

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Overall Engagement	3.20 (0.78)	3.47 (0.71)	2.52	0.012*	0.36

*Significant at $p < 0.05$

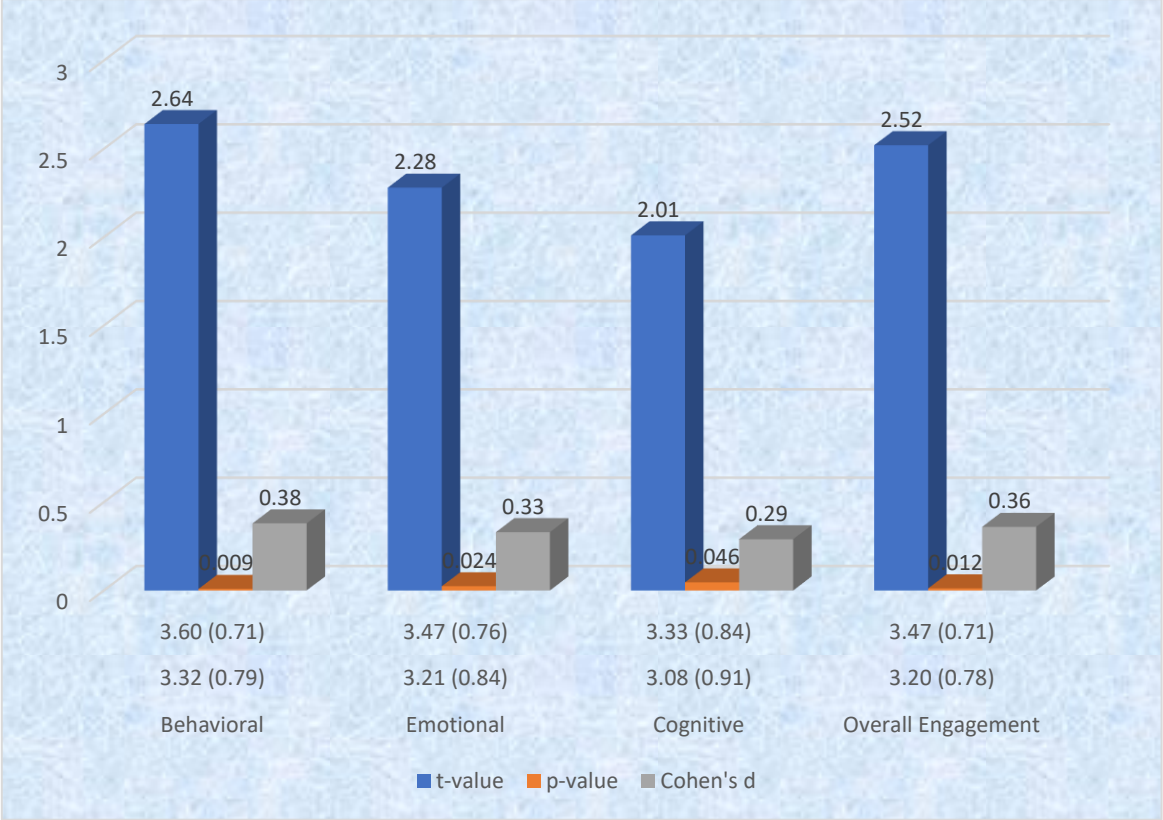

Table 5.7: Comparison of Engagement Levels by Institution Type

Students at government and private institutions differed significantly on all involvement characteristics, according to an independent samples t-test. When compared to their peers in government schools, students at private universities reported considerably higher levels of behavioral involvement ($t=2.64$, $p=0.009$), emotional engagement ($t=2.28$, $p=0.024$), cognitive engagement ($t=2.01$, $p=0.046$), and total engagement ($t=2.52$, $p=0.012$). The effect sizes (Cohen's d) showed significant practical relevance, ranging from modest to moderate (0.29 to 0.38). **H_4 is supported.**

Better facilities, lower class sizes, easier access to digital resources, more frequent use of interactive teaching techniques, and more parental participation in private schools are some of the reasons for these discrepancies.

5.7 Comparative Analysis by Gender

H_5: Gender Differences in Student Engagement

Table 5.9: Gender Differences in Engagement Levels

Engagement Dimension	Male (n=108) Mean (SD)	Female (n=92) Mean (SD)	t-value	p-value	Cohen's d
Behavioral	3.44 (0.78)	3.53 (0.73)	0.84	0.402	0.12
Emotional	3.32 (0.83)	3.41 (0.78)	0.79	0.431	0.11

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Cognitive	3.18 (0.91)	3.27 (0.85)	0.72	0.472	0.10
Overall Engagement	3.31 (0.77)	3.40 (0.72)	0.86	0.391	0.12

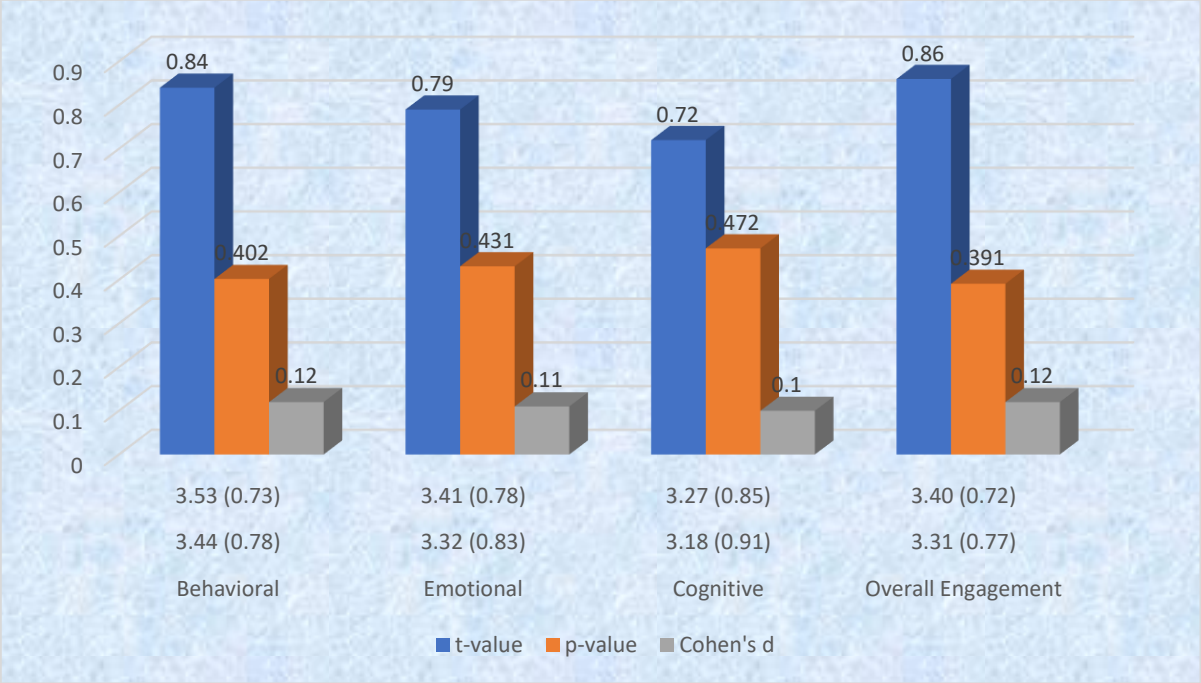

Figure 5.8: Gender Differences in Engagement Levels

In every engagement parameter, there were no discernible gender differences ($p > 0.05$ for all comparisons). When exposed to interactive teaching tactics, male and female students report identical levels of involvement, according to the insignificant effect sizes ($d < 0.12$).. **H_5 is accepted.**

According to this research, interactive teaching techniques are equally beneficial to male and female students and may help achieve gender parity in commerce school results.

5.8 Additional Comparative Analyses

Table 5.10: Comparison by Residential Background and Class

Variable	Category	n	Overall Engagement Mean (SD)	Test Statistic	p-value
Residential Background	Urban	78	3.42 (0.73)	t=1.12	0.264
	Rural	122	3.31 (0.76)		
Class	Class XI	112	3.33 (0.77)	t=0.48	0.632
	Class XII	88	3.38 (0.73)		

Residential origin (rural vs. urban) or class (XI vs. XII) did not significantly affect overall student participation. This suggests that interactive teaching techniques consistently improve student involvement across different demographic groups.

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5.9 Summary of Hypothesis Testing

Table 5.11: Summary of Hypothesis Testing Results

Hypothesis	Statement	Result
H_1	Gamification positively relates to student engagement	Supported
H_2	Experiential learning positively relates to student engagement	Supported
H_3	Digital tools positively relate to student engagement	Supported
H_4	Significant difference between government and private institutions	Supported
H_5	No significant gender difference in engagement	Accepted

6. DISCUSSION

6.1 Interpretation of Major Findings

In the semi-urban setting of the Harda region, the results of this research provide solid empirical support for the beneficial effects of interactive teaching techniques on student involvement in commerce education. Gamification, experiential learning, and the integration of digital tools greatly increase student engagement among commerce students, according to all three of the hypotheses that looked at the connections between certain interactive tactics and engagement. According to Kolb's Experiential Learning Theory, experiential learning was found to be the strongest predictor of student engagement (β=0.28 in the combined model). This finding supports earlier studies that show the effectiveness of practical, hands-on learning methods in business education [5,13]. Through the application of abstract commerce ideas to real-world scenarios, experiential learning techniques—such as business simulations, project-based learning, case study discussions, and field-based experiences—deepen cognitive engagement and improve comprehension. Because courses like accounting, business studies, and economics have direct applicability in actual company settings, this is especially important for commerce school. This perspective is further supported by the TEACH-model study's results of enhanced student outcomes via practical projects [15].

Research showing that game-based aspects boost motivation and engagement in technical commerce disciplines is supported by gamification's strong impact to student engagement (β=0.24) [10,11]. Gamified learning's competitive aspects, instant feedback, and interactive challenges seem to speak to students' psychological demands for relatedness, competence, and autonomy. The discovery that gamification exhibited a comparatively larger correlation with emotional engagement (r=0.49) implies that gaming components specifically improve students' affective reactions to learning—interest, pleasure, and favorable views about topics related to commerce.

The favorable impact of digital tool integration on engagement (β=0.21) is consistent with studies on technology-enhanced business education [16,17]. The high rates of smartphone ownership (84%) and internet access (71%) among Harda's commerce students indicate substantial potential for mobile-based and online learning interventions, notwithstanding infrastructure limitations in semi-urban situations. Technology integration may be especially successful in encouraging active involvement and sustained attention in commerce courses, according to the association between digital tools and behavioral engagement (r=0.47).

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Institutional Disparities: The much greater levels of involvement seen in private schools as opposed to public ones ($p=0.012$, $d=0.36$) demonstrate the importance of institutional resources and pedagogical adaptability in putting interactive tactics into practice. This result is in line with studies showing differences in resources between Indian government and private schools [20]. Larger class numbers, a lack of digital infrastructure, a lack of teaching tools, and restricted teacher autonomy are some of the issues that government schools in Harda often deal with. These issues might make it more difficult to use interactive teaching methods.

An encouraging conclusion is that there are no significant gender differences in participation ($p>0.05$ for all comparisons), indicating that interactive teaching methods are inclusive and equally beneficial to male and female students. This is consistent with studies showing that well-designed interactive education may produce egalitarian results, but it also contradicts other research that suggests gender differences in learning preferences [9].

6.2 Theoretical Implications

In a number of ways, this research advances the theoretical conversation on interactive instruction and student involvement. In the particular field of commerce education in a semi-urban Indian setting, it first validates and expands Kolb's Experiential Learning Theory, showing that experiential approaches are especially effective in boosting cognitive engagement—the dimension most closely associated with deep learning and critical thinking [5]. Second, it shows how different interaction tactics affect different engagement aspects differently and offers empirical evidence for the multidimensional view of student involvement. Third, the research provides a repeatable framework for examining pedagogical advances in comparable educational environments, which may make cross-contextual comparisons easier.

6.3 Practical Implications

For commerce educators, educational administrators, and policymakers in Harda and similar semi-urban contexts, the findings suggest several actionable strategies:

1. **Prioritize Experiential Learning Opportunities**: Given experiential learning's strong predictive power for engagement, commerce curricula should incorporate more project-based learning, business simulations, case study discussions, and real-world problem-solving activities. Even resource-constrained settings can implement low-cost experiential approaches such as classroom-based business simulations, local business case studies, and community-based projects.
2. **Leverage Gamification Elements**: Simple gamification elements—quizzes, competitions, point systems, badges, and leaderboards—can significantly boost engagement without requiring extensive resources. Commerce educators can incorporate these elements into regular instruction using available tools.
3. **Maximize Available Technology**: With 84% smartphone ownership and 71% internet access among students, educators should explore mobile-based interactive tools, educational apps, online resources, and blended learning approaches. Teacher training programs should emphasize technology integration skills.

4. **Address Institutional Disparities**: The significant gap between government and private institutions warrants policy attention. Government schools may require additional support through targeted teacher training programs, infrastructure development, digital resource provision, and reduced class sizes to enable effective implementation of interactive strategies.
5. **Target Cognitive Engagement**: Since cognitive engagement scored lowest among engagement dimensions, strategies specifically targeting deep learning and critical thinking should be prioritized. These may include problem-based learning, inquiry-based approaches, and activities requiring analysis, evaluation, and synthesis of commerce concepts.
6. **Invest in Teacher Professional Development**: Effective implementation of interactive strategies requires teachers who are skilled in facilitation, technology integration, and student-centered pedagogy. Comprehensive professional development programs should be established for commerce educators in Harda district.

6.4 Limitations of the Study

Several limitations should be acknowledged when interpreting the findings:

1. **Geographical Scope**: The study was limited to Harda district, which may affect generalizability to other contexts with different demographic, cultural, and infrastructural characteristics. However, the detailed description of the study context enables readers to assess applicability to similar settings.
2. **Cross-Sectional Design**: Data were collected at a single point in time, limiting causal inferences. While regression analysis establishes predictive relationships, it cannot definitively establish causality. Longitudinal studies are needed to examine causal pathways.
3. **Self-Report Measures**: Reliance on student self-reports may introduce response biases including social desirability bias and common method variance. Future research should incorporate multiple data sources including teacher reports, classroom observations, and objective learning outcomes.
4. **Single-Group Design**: The absence of a control group limits comparison with traditional instruction. Future research employing quasi-experimental or experimental designs would strengthen causal evidence.
5. **Focus on Student Perceptions**: Teacher perspectives on implementing interactive strategies, including challenges and facilitators, were not assessed. Understanding teacher experiences is essential for developing effective implementation support.
6. **Limited Scope of Interactive Strategies**: The study examined three categories of interactive strategies; other approaches such as collaborative learning, flipped classrooms, and peer instruction were not explicitly measured.

6.5 Suggestions for Future Research

Based on the findings and limitations, future research should:

1. **Employ Longitudinal Designs**: Track students over time to examine sustained effects of interactive teaching strategies on engagement and learning outcomes.

2. **Include Control Groups**: Compare interactive teaching with traditional instruction using quasi-experimental or experimental designs.
3. **Incorporate Multiple Data Sources**: Combine student self-reports with teacher ratings, classroom observations, and objective measures of learning outcomes such as academic performance and skill assessments.
4. **Examine Moderating Variables**: Investigate how student characteristics (prior achievement, learning styles, socioeconomic status) and contextual factors (class size, infrastructure, teacher qualifications) moderate the relationship between interactive strategies and engagement.
5. **Conduct Intervention Studies**: Implement and evaluate specific interactive teaching interventions to establish causality and identify effective implementation practices.
6. **Explore Teacher Perspectives**: Investigate teacher experiences, challenges, and professional development needs related to implementing interactive strategies in commerce education.
7. **Expand Geographical Coverage**: Replicate the study across multiple districts and states to enhance generalizability and examine contextual variations.
8. **Examine Additional Interactive Strategies**: Investigate other approaches such as collaborative learning, peer instruction, and flipped classrooms within commerce education contexts.

7. CONCLUSION

This research examined how interactive teaching methods affected upper secondary students' interest in commerce education in Madhya Pradesh's Harda district. The results unequivocally show that gamification, experience learning, and the integration of digital tools greatly improve student engagement, with experiential learning being the most powerful predictor. These interactive tactics together significantly influence engagement results, as shown by the combined model's ability to explain 35% of the variation in student involvement.

The study adds empirical data from a semi-urban Indian setting to the international conversation on creative pedagogy in business education. It emphasizes the need of eschewing conventional lecture techniques in favor of more participatory, student-centered methods that better equip students for the ever-changing demands of the corporate world. The notable differences between public and private schools emphasize the necessity for targeted assistance and fair resource distribution to guarantee that all commerce students get interesting teaching.

Investing in interactive teaching strategies, such as curriculum reform, technology integration, teacher training, and resource provision, can result in significant improvements in student engagement and, ultimately, learning outcomes. This is a clear message for Harda's commerce educators and educational administrators. Students' high smartphone adoption offers chances for creative, low-cost interactive strategies that make use of mobile technology.

To sum up, interactive teaching techniques are an effective way to raise student interest in business education. They have the potential to revolutionize commerce education by producing graduates who are not only knowledgeable but also engaged, skilled, and ready for the challenges of the contemporary business environment if they are systematically implemented

in Harda's higher secondary institutions with due consideration for contextual factors and institutional disparities. Adopting interactive pedagogies is not only a choice but an educational need as commerce education continues to change in response to market demands and technology improvements.

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