

How User Interaction Satisfaction Shapes Success in ERP Simulation Games

Sung Shim

Department of Computing and Decision Sciences, Stillman School of Business, Seton Hall University, South Orange, New Jersey, USA

Email: sung.shim@shu.edu

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Abstract—This study investigates the relationship between students' perceptions of their user interaction experiences and their performance in an Enterprise Resource Planning (ERP) system-based simulation. Survey responses from seventy-six undergraduate students participating in the Enterprise Resource Planning ERP simulation (ERPsim) Maple Introduction game were analyzed. Several aspects of the user interaction experience were assessed based on these responses. Factor and reliability analyses confirmed the validity and reliability of each construct. Each aspect of user interaction experience exhibited strong intercorrelations and was not independently associated with performance. However, when all aspects were considered collectively, their combination was significantly associated with improved performance. The model accounted for approximately 50 percent of the variance in performance, supporting the proposition that overall user experience is strongly linked to performance. These findings suggest that students' success in ERP simulations depends on the quality of their collective interactions rather than any single feature. By integrating previous research into a cohesive framework, this study provides empirical evidence of the association between user experience quality in ERP simulation settings and learning outcomes.

Keywords—user interaction satisfaction, Enterprise Resource Planning (ERP), ERP simulation (ERPsim), simulation learning, student performance

I. INTRODUCTION

Since enterprises have used Enterprise Resource Planning (ERP) systems to integrate all organizational functions - such as procurement, production, sales, inventory control, and financial accounting - many educational institutions now use simulation-based training platforms. These platforms help students gain practical knowledge and decision-making skills in a virtual environment. ERP simulation (ERPsim) games allow students to engage directly with SAP ERP system by performing real-time tasks in simulated business activities. Through ERPsim games, students participate in experiential learning. They apply theoretical knowledge, analyze business data, and make strategic decisions in response to changing organizational environments.

ERPsim games, developed by HEC Montréal, simulates a real-world business environment [1, 2]. The ERPsim Maple Introduction Game, also from HEC Montréal, creates a competitive setting where students manage the purchasing, pricing, inventory, and sales of maple syrup products in Germany [3]. As managers, students perform operational tasks in response to market changes and competitors' actions. Participating in this simulation strengthens understanding of ERP processes, analytical thinking, collaboration, and problem-solving. Studies show ERPsim games increases student engagement, knowledge retention, and decision-making through its hands-on approach [4].

Although there is growing interest in using ERPsim games in post-secondary education, prior research has focused mainly on learning outcomes, system adoption, and students' subjective experiences with ERPsim games. There is limited focus on how students' perceptions of user interaction with ERPsim games affect their performance during the simulation experience. Regardless of the quality of the educational technology used, if users find it difficult to navigate the technology, interpret information, or engage comfortably with the interface, they may not be able to effectively realize the desired benefits. Therefore, students' performance may depend not only on knowledge of the technical aspects of ERP systems but also on the quality of the user experience.

To fill this gap, this study investigates students' experiences with the ERPsim Maple Introduction game using the Questionnaire for User Interaction Satisfaction (QUIS). QUIS is a valid assessment instrument for examining user perceptions toward digital systems. QUIS measures several dimensions of interaction satisfaction, i.e., overall reaction, screen/interface design, terminology, information quality, learning support, system capabilities, and overall usability experience. These dimensions represent a comprehensive framework for analyzing students' perceptions about their interactions with ERPsim games.

This study has three main goals. First, it assesses whether users' satisfaction with the ERPsim game correlates with their simulation performance. Second, it analyzes how the six QUIS dimensions contribute to users' simulation outcomes. Third, it evaluates whether the combined effects of these dimensions better explain users' outcomes than any single dimension. Overall, the study aims to expand our understanding of how users' experiences affect learning in ERPsim games.

This study builds knowledge by integrating the Technology Acceptance Model (TAM), self-efficacy theory, and the Information Systems (IS) success model to explain ERPsim game performance. These models show that perceived ease of use, usefulness, confidence in technology, system quality, and user satisfaction together affect digital performance. By linking these ideas to QUIS-measured dimensions, this study establishes a framework for predicting success in ERPsim games. The practical implications of this study may inform educators, instructional designers, and institutions seeking to enhance ERP-based learning environments. By identifying aspects of user interaction associated with performance, educators can design simulations that cultivate students' confidence, engagement, and learning. Moreover, prioritizing students' interaction experiences within ERP education may increase satisfaction and academic achievement.

II. LITERATURE REVIEW

This study uses three theoretical frameworks: TAM, self-efficacy theory, and Information System (IS) success model. These frameworks investigate how student performance relates to user interaction satisfaction in ERPsim games. TAM states that perceived ease of use and perceived usefulness determine a person's attitude toward using technology. Recent research confirms that perceived usefulness, ease of use, and user satisfaction are critical to technology adoption and learning outcomes in digital environments [5, 6]. Self-efficacy theory holds that belief in one's ability to apply knowledge and skills influences engagement in the system and learning outcomes. IS success model also supports that system quality (usability and information quality) and user satisfaction are key to system success. Based on this background, this study assumes that high user interaction satisfaction leads to better performance in ERP simulation tasks. The study identifies six QUIS dimensions of user interaction satisfaction to assess how user experience relates to performance outcomes in ERPsim games.

A. User Interaction Satisfaction

Substantial research shows that people with confidence in technology (computer self-efficacy) are more likely to try new technology than those without such confidence. People who feel comfortable with digital tools will find them easy to use and want to use them [7–9]. When it comes to business software, particularly complex systems such as ERP systems,

technically competent students and employees find these tools easier to manage and more useful [10, 11]. All these studies show the same thing: confidence in technology is an essential factor for a good experience, particularly when dealing with advanced software.

While we have learned that belief in one's ability to perform a task is essential, it remains unclear how this belief influences students' experiences when they first use ERP-based simulations such as ERPsim games. Some students may come in with extensive software experience and quickly adapt to the SAP ERP system, navigate reports easily, make business decisions, and feel very comfortable. However, others may feel anxiety or be confused if they have never used this type of software before or if the instructions were unclear. Given that ERPsim games throw students into deep water right away, students' attitudes can go from excited to frustrated in mere minutes. If the ERPsim game user interface is easy to use and provides immediate, clear feedback, confidence builds, and students become more actively involved with the software. Conversely, if the ERPsim game user interface feels confusing and feedback is delayed, that confidence is rapidly diminished, thereby limiting the amount of learning that takes place. Therefore, it is essential to investigate how students experience the learning environment. What moments made students feel empowered and excited to continue? Which moments left students stuck or discouraged? In doing so, educators can create learning environments that meet each student's needs, regardless of prior levels of technological expertise [12, 13].

Table 1. QUIS measures

Variables		9-point scale	
V1. Overall reactions to the ERPsim system (V1)	V1-1. Terrible to wonderful	1 - terrible	9 - wonderful
	V1-2. Difficult to easy	1 - difficult	9 - easy
	V1-3. Frustrating to satisfying	1 - frustrating	9 - satisfying
	V1-4. Inadequate to adequate power	1 - inadequate power	9 - adequate power
	V1-5. Dull to stimulating	1 - dull	9 - stimulating
	V1-6. Rigid to flexible	1 - rigid	9 - flexible
V2. Screen	V2-1. Characters on the computer screen	1 - hard to read	9 - easy to read
	V2-2. Highlighting on the screen simplifies task	1 - not at all	9 - very much
	V2-3. Organization of information on the screen	1 - confusing	9 - very clear
	V2-4. Sequence of screens	1 - confusing	9 - very clear
V3. Terminology and system information	V3-1. Use of terms throughout system	1 - inconsistent	9 - consistent
	V3-2. Terminology is related to the task you are doing	1 - never	9 - always
	V3-3. Position of messages on screen	1 - inconsistent	9 - consistent
	V3-4. Messages on screen which prompt user for input	1 - confusing	9 - very clear
	V3-5. System keeps you informed about what it is doing	1 - never	9 - always
	V3-6. Error messages	1 - unhelpful	9 - helpful
V4. Learning	V4-1. Learning to operate the system	1 - difficult	9 - easy to read
	V4-2. Exploring features by trial and error	1 - difficult	9 - easy to read
	V4-3. Remembering names and use of commands	1 - difficult	9 - easy to read
	V4-4. Tasks can be performed in a straight-forward manner	1 - never	9 - always
	V4-5. Help messages on the screen	1 - unhelpful	9 - helpful
	V4-6. Supplemental reference materials (such as Job Aid)	1 - confusing	9 - very clear
V5. System capabilities	V5-1. System speed	1 - too slow	9 - fast enough
	V5-2. System reliability	1 - unreliable	9 - reliable
	V5-3. System tends to be: noisy to quiet	1 - noisy	9 - quiet
	V5-4. Correcting mistakes	1 - difficult	9 - easy
	V5-5. Experienced and inexperienced users' needs are considered	1 - never	9 - always
V6. Usability and user interface	V6-1. Use of colors and sounds	1 - poor	9 - good
	V6-2. System feedback	1 - poor	9 - good
	V6-3. System response to errors	1 - awkward	9 - gracious
	V6-4. System messages and reports	1 - poor	9 - good
	V6-5. System clutter and user interface "noise"	1 - poor	9 - good

This study used QUIS [14] to gain a clear understanding of students' feelings about their use of ERPsim games. QUIS has been used to gather honest feedback from users of digital

products in real-world settings. The questions are basic: was the system inviting or confusing; did the input provided assist; and did the process of using the software feel smooth

and/or awkward overall. Students' completion of QUIS after participating in ERPsims games would allow them to share with researchers what worked and what did not. Thus, researchers could gain insight into which aspects of ERPsims games helped students develop confidence and engagement, while identifying potential areas of frustration. This is all about creating an understanding of the student's experience through the student's words and reaction. Table 1 lists the QUIS measures used in this study.

Based on TAM, users are more likely to use an application and use it productively if they believe it is easy to use and useful. For this study, QUIS measures such as V1 (reaction to overall), V2 (design/organization of screens/interfaces), V4 (support for learning), and V6 (the experience of usability) were used to assess the perceived ease of use factor since they represent how usable or intuitive students believed the ERPsims game was. On the other hand, V3 (quality of terminology/information) and V5 (capabilities/system features) were assessed as representing the perceived usefulness factor because they represented how well ERPsims supported meaningful decisions based upon relevant data. As a result, students who found the ERPsims game helpful and easy to access would perform better than those who did not.

The self-efficacy theory also states that individuals who are confident in their ability to operate computer systems will tend to use them more frequently and more deeply. Therefore, students who had higher confidence in their ability to successfully interact with the ERPsims game due to clearer instructions and/or more favorable user experiences from the

perspectives of V4 (learning support/guidance), V6 (overall usability), and V1 (overall reaction), will be expected to exhibit higher degrees of usage and performance.

Finally, IS success model emphasizes the importance of system quality, information quality, and user satisfaction as important factors influencing information system success. In this case, V2 (design/interface screen) and V6 (usability) assess the system's quality through effective interface operation and ease of use. V3 (terminology/information quality) assesses the quality of information output through clarity, relevance, and utility. Finally, V1 (general reaction to overall) assesses total user satisfaction with the ERPsims game. Each of these factors is expected to improve each student's performance by enhancing the system's utilization.

Together, these models indicate that QUIS measures contain essential antecedent conditions for successful ERPsims game usage and subsequent academic achievement. Table 2 summarizes the QUIS measures for each theory. Additionally, Fig. 1 illustrates the conceptual model utilized for this study.

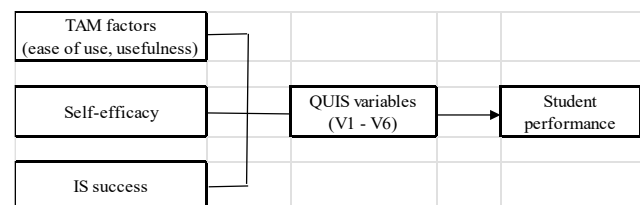


Fig. 1. The study model.

Table 2. Mapping QUIS variables to related theories

QUIS Variable	Meaning	Related theory
V1	Overall reaction / satisfaction	TAM, Self-Efficacy, IS Success
V2	Screen / interface design	TAM, IS Success
V3	Terminology / information quality	TAM, IS Success
V4	Learning support / guidance	TAM, Self-Efficacy
V5	System capabilities / features	TAM, IS Success
V6	Overall usability experience	TAM, Self-Efficacy, IS Success

B. ERPsims Games

The ERPsimsLab team at HEC Montreal developed a series of ERP simulation games that allow students to participate in the actual operations of a business. They are not just any ERP games—they are built to be an actual workplace, simulating the challenges of logistics, manufacturing, retail, and distribution [1]. Where ERPsimsLab's games differ from other ERP-based educational tools is that they use SAP ERP system, the exact ERP tool many businesses use worldwide. Thus, instead of simply studying business concepts and theories, students can "try" their ideas and see the immediate effects of their decisions. Students also learn to work as a team in a simulated company environment. This aligns with broader findings in simulation-based learning, which show that immersive and interactive environments enhance engagement and knowledge retention [15, 16]. The hands-on approach bridges the theoretical concepts learned in the classroom to their practical application in the workforce [17, 18]. ERPsims games promote experiential learning by allowing students to apply theoretical knowledge in real-time decision-making scenarios.

This research aimed to provide an in-depth analysis of the Maple Introduction game. In this game, students assume the role of a wholesale manager seeking success in a dynamic,

competitive German marketplace [3]. The game requires students to manage a virtual company by making real-time decisions on pricing, procurement, and inventory in SAP ERP. Fig. 2 illustrates the layout of the game. It highlights the key transactions they perform and the reports available to support decision-making, such as procurement, pricing, and reporting activities, all of which directly influence performance outcomes. In the simulation, students manage numerous aspects of the operation, including planning, purchasing, and sales, all within a unified ERP system. For each round of the game, students must analyze data contained in system reports, make strategic decisions based upon that analysis, and modify their strategy based upon changes to the market conditions—like what real-world business managers would have to do.

The ERPsims Maple Introduction simulation was conducted during one full class session lasting approximately two and a half hours. During this session, students participated in the team-based ERPsims activity, interacted with the SAP ERP system, and completed the simulation exercise as part of their experiential learning activities designed to enhance engagement and interest in ERP concepts.

One of the most attractive features of the methodology

employed by ERPsim games is that students gain a solid understanding of how a business operates through experimentation and learning as they progress through the simulation, rather than simply reading about it [19, 20]. Furthermore, while students are gaining knowledge of business concepts and processes, they are also developing

their decision-making skills, which research has shown to be retained over time [21, 22]. Although this study focuses on the Maple Introduction game, potential areas for future research include comparing different versions of ERPsim games to examine the effects of varying levels of setup complexity, business contexts, and student enjoyment.

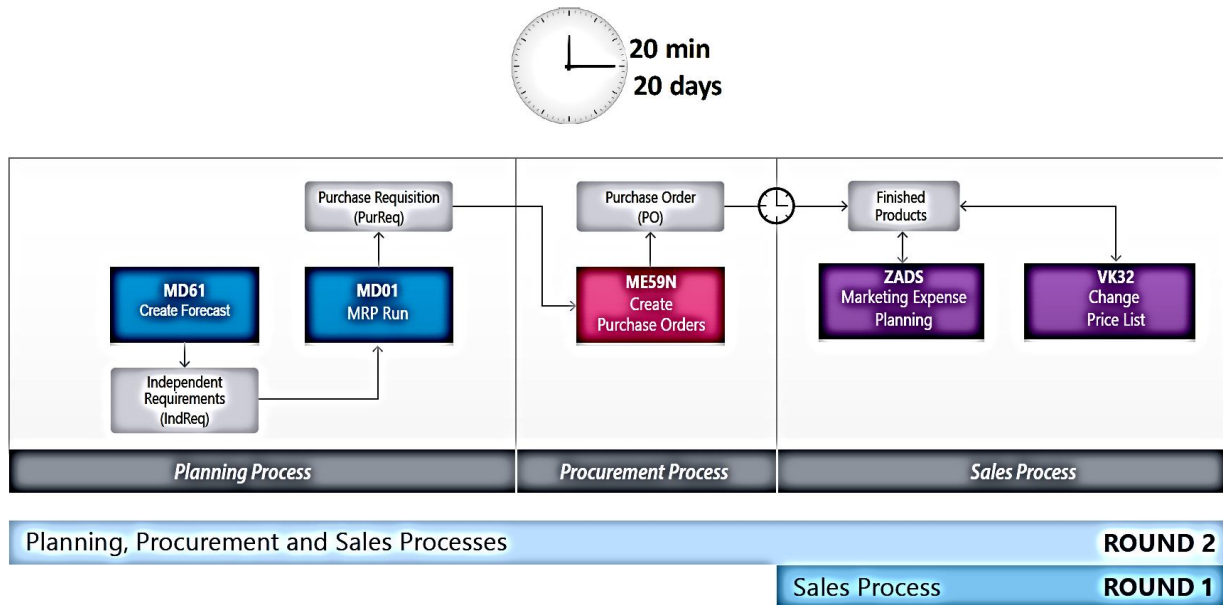


Fig. 2. Layout of ERPsim Maple Introduction game.

III. DATA AND METHODS

This study employed a quantitative research design that utilized survey data and regression analysis to identify whether there is a relationship between student performance and user interaction satisfaction in the ERPsim game. We selected a convenience sample of seventy-six undergraduate students who had completed an ERP Systems course. To collect the data for this study, we distributed a structured questionnaire immediately after the simulation game. The primary tool for measuring the quality of the users' experience was QUIS. There are six areas of users' experiences with ERPsim game that are assessed by the QUIS; they are: (1) overall reaction to the system, (2) screen/interface design, (3) terminology and information quality, (4) learning support/guidance, (5) system capabilities and functional features, and (6) overall usability experience. Each item uses a nine-point scale to measure user satisfaction. Higher values indicate a more positive perception of the system.

Student performance was the dependent variable measured using team profit scores generated within the ERPsim game environment. Although the participants were undergraduate students enrolled in a single ERP Systems course, the ERPsim Maple Introduction simulation was conducted in collaborative teams. Each team managed a virtual company and made joint business decisions related to pricing, procurement, inventory, and sales. Therefore, the performance measure reflects the collective outcomes achieved by each team during the simulation exercise rather than individual academic grades or course performance. Factor analysis and reliability analysis were both used to assess construct validity and internal consistency of the measures. Descriptive statistics and correlation analysis were

also used to summarize the data and describe the relationships between variables. Finally, multiple regression analysis was used to determine whether each of the six QUIS dimensions has a unique effect on student performance, and whether all the dimensions have a combined effect.

IV. RESULT AND DISCUSSION

We were interested in whether students had different experiences interacting with the ERPsim game across six areas of user interaction. Table 3 presents the descriptive statistics for six variables related to user interaction satisfaction and performance. Most students did well, earning an average team score of 9.54 based on profit in the game; however, satisfaction with the experience varied significantly. While some students appreciated the ERPsim game and the opportunity to participate, others encountered difficulties with specific aspects of the game. The diversity of student feedback demonstrates that students interacted with the game in multiple ways and sets the stage for examining the relationship between their enjoyment of the experience and their ability to perform effectively.

All six variables of user interaction satisfaction in Table 4 are highly correlated, ranging from 0.715 to 0.848, suggesting that they measure very similar perceptions of their use of the ERPsim game. Because the variables are highly correlated, it is difficult to isolate any one variable and claim it is the most important. Therefore, although the model as a whole was strong, no individual factor proved significant in the analysis.

The factor analysis results in Table 5 indicate that the six-factor solution has an acceptable general fit with the data. Most variables have moderate to high communality, indicating that the six factors explain a large portion of each

variable's total variance. Thus, it can be inferred that the underlying factor structure reflects the key constructs measured by the items. Although several variables exhibit lower communality, this should not detract from the interpretation of the factor structure. Overall, the six-factor

solution demonstrated adequate construct validity. Although no major revisions were needed, some additional clarification could be achieved by revising or eliminating poorly loading items.

Table 3. Descriptive statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Performance	76	5.25	12.50	9.54	2.27
V1	76	1.00	9.00	5.34	1.84
V2	76	1.00	9.00	5.74	2.17
V3	76	1.00	9.00	6.05	1.94
V4	76	1.00	9.00	5.26	2.03
V5	76	1.00	9.00	5.95	2.00
V6	76	1.00	9.00	5.69	2.33

Table 4. Correlation matrix

Variable	V1	V2	V3	V4	V5	V6
V1	1	0.731**	0.736**	0.729**	0.725**	0.745**
V2	0.731**	1	0.818**	0.747**	0.720**	0.757**
V3	0.736**	0.818**	1	0.780**	0.817**	0.812**
V4	0.729**	0.747**	0.780**	1	0.739**	0.715**
V5	0.725**	0.720**	0.817**	0.739**	1	0.848**
V6	0.745**	0.757**	0.812**	0.715**	0.848**	1

** . Correlation is significant at the 0.01 level (2-tailed); Sig. (2-tailed): 0.000; N = 76

Table 5. Factor analysis

Item	V1	V2	V3	V4	V5	V6
V1-1	0.7780					
V1-2	0.6058					
V1-3	0.7796					
V1-4	0.4667					
V1-5	0.6798					
V1-6	0.5538					
V2-1		0.5740				
V2-2		0.6567				
V2-3		0.7491				
V2-4		0.6898				
V3-1			0.6716			
V3-2			0.6249			
V3-3			0.6870			
V3-4			0.7677			
V3-5			0.7452			
V3-6			0.5299			
V4-1				0.7628		
V4-2				0.6194		
V4-3				0.6498		
V4-4				0.7174		
V4-5				0.7910		
V4-6				0.7806		
V5-1					0.7349	
V5-2					0.7658	
V5-3					0.7177	
V5-4					0.7222	
V5-5					0.6839	
V6-1						0.7947
V6-2						0.8745
V6-3						0.9085
V6-4						0.7994
V6-5						0.7683

Extraction Method: Principal Axis Factoring.

Reliability analysis results in Table 6 indicate that all six variables are reliably measured. The reliability analysis reveals that all six variables demonstrated high to excellent internal consistency, as indicated by Cronbach's alpha values. The results clearly provide strong evidence that the items for the constructs can be combined into reliable scales. Importantly, Cronbach's alpha score for V6 was 0.956, which is considered an excellent reliability measure. While this measure of internal consistency is desirable, it should be noted that if it were too high, it might indicate that some items are so similar in content that one or two would be sufficient. Overall, this reliability data supports the

conclusion that all constructs are measured reliably. There does not appear to be any issues with respect to the internal consistency of measurement at present.

Table 6. Reliability statistics

Variable	Cronbach's Alpha	N of Items
V1	0.893	6
V2	0.894	4
V3	0.917	6
V4	0.917	6
V5	0.891	5
V6	0.956	5

Table 7 illustrates the relationship between students' perceptions of user interaction with the ERPsim game and their performance in the game. Independent variables include six dimensions of user interaction satisfaction; the dependent variable is student performance in the ERPsim game. There appears to be a clear relationship when all six satisfaction measures are analyzed together. Students who reported satisfaction with the ERPsim game and/or found it simple to use typically performed better than those who reported dissatisfaction. Almost 50 percent of the performance differences among teams can be explained by satisfaction ratings. This is significant because it indicates that how students perceive the user interaction with the game is associated with their performance, rather than simply luck or prior knowledge of ERP systems. Even after accounting for the analysis's complexity, the relationship remains strong. Therefore, if students have a positive experience with the ERPsim game, they are more likely to complete the simulation successfully. This finding is consistent with prior studies demonstrating that user satisfaction is strongly associated with performance in digital learning systems [23, 24].

Table 8 provides evidence that our findings are not coincidental—the correlation between satisfaction and performance is present. The analysis demonstrates that analyzing all six satisfaction measures simultaneously yields a robust predictive model for students' performance in ERPsim. Although no individual satisfaction rating stands out as a predictive variable, the collective contribution of the

six satisfaction variables helps explain what facilitates students' success.

Table 7. Model summary

<i>R</i>	<i>R</i> Square	Adjusted <i>R</i> Square	Std. Error of the Estimate
0.676 ^a	0.457	0.409	1.7436

a. Predictors: (Constant), V6, V4, V1, V2, V5, V3

Table 8. ANOVA^a

Model	Sum of Squares	df	Mean Square	<i>F</i>	Sig.
Regression	176.212	6	29.369	9.661	< 0.001 ^b
Residual	209.766	69	3.040		
Total	385.978	75			

a. Dependent Variable: Performance

b. Predictors: (Constant), V6, V4, V1, V2, V5, V3

Table 9 presents the relative contributions of the individual measures of user interaction to students' performance in the ERPsim game. While students who found the game's clarity

and ease of use useful may have performed slightly better, the study lacked sufficient statistical power to conclude that this was anything more than a coincidence. Only when all the satisfaction measures are combined does the collective association with students' performance become evident. This illustrates the holistic nature of students' experiences with the ERPsim game, shaped by the game as a whole rather than by individual measures.

Table 9. Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		<i>t</i>	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
(Constant)	5.140	0.713			7.210	0.000		
V1	0.001	0.187	0.001		0.006	0.995	0.339	2.947
V2	0.310	0.177	0.297		1.749	0.085	0.274	3.653
V3	0.061	0.232	0.052		0.261	0.795	0.199	5.029
V4	0.336	0.177	0.301		1.902	0.061	0.314	3.181
V5	0.001	0.214	0.001		0.005	0.996	0.221	4.518
V6	0.083	0.185	0.086		0.450	0.654	0.217	4.610

a. Dependent Variable: Performance

Table 9 also presents tolerance and Variance Inflation Factor (VIF) measures used to assess the degree of multicollinearity among the independent variables. The lowest tolerance was 0.199, and the highest was 0.339; similarly, the lowest VIF was 2.947, and the highest was 5.029. A common rule of thumb is that if tolerance < 0.1 or VIF > 10, there are serious multicollinearity concerns with your data. VIF > 5 indicates a moderate concern about multicollinearity. No variable had a VIF greater than 10, so no variable had a severe multicollinearity issue. However, V3 has the largest VIF (5.029) and the smallest tolerance (0.199), indicating moderate multicollinearity. Both V5 (VIF = 4.518) and V6 (VIF = 4.610) have high VIF's as well. Overall, the results indicated that multicollinearity did not exceed reasonable limits for this model, but some predictor variables were moderately correlated and could affect the reliability of regression coefficient estimates.

Students do not view the components of user interaction satisfaction as independent factors; instead, they tend to combine many of them. For example, a student who finds the ERPsim game easy to navigate will describe the information provided as organized and the graphics as appealing. Students will frequently reference the clarity of the instruction as a determining factor on whether the entire simulation felt stress-free; conversely, confusing directions or a chaotic pace would make them feel disoriented. Overall, students described their ERPsim game experience as a large-scale picture that included navigation, visual cues, and the level of support for the game, which together produced either flow or frustration. When something does not work correctly or the instructions are unclear, it can negatively affect students' motivation and confidence for the rest of the game. Conversely, if everything is working well — such as if the instructions are clear and every feature functions as intended—then students tend to be motivated, confident, and eager to dive deeper.

The results of the regression analysis should be interpreted cautiously because several potentially important variables were excluded from this study. Those variables include prior ERP experience, academic performance—Grade Point Average (GPA), and demographics. Since those variables were not included in the model, they could have introduced omitted-variable bias into the estimation. Thus, the estimates obtained in this study relate primarily to the main variables of interest for which data were collected; however, the association between these variables may be influenced by other (unobserved) factors.

V. CONCLUSION

This study shows that students do not view their ERPsim experience as a collection of separate features, such as usability, interface design, or information quality. Instead, they evaluate the experience as a whole. Although user interaction satisfaction was measured across six dimensions, the findings suggest that these dimensions work together to shape students' overall impressions of the system. In turn, this overall experience is more closely associated with learning performance than any single aspect of the interaction.

The results also reveal significant relationships between user interaction satisfaction and student performance. However, because the data were collected at a single point in time, these findings should be interpreted as associations rather than evidence of causality. While students who reported more positive experiences also tended to perform better, the study cannot determine whether satisfaction leads to improved performance or whether successful students simply view the system more positively.

This study contributes to the ERPsim literature by introducing and validating a multidimensional model of user interaction satisfaction based on six QUIS dimensions. Rather than examining each dimension in isolation, the

findings highlight the importance of considering students' overall experience with the system. This broader perspective provides a more complete understanding of how different aspects of user interaction collectively relate to learning outcomes in ERP simulation environments.

The findings should be considered in light of several limitations. The six dimensions of user interaction satisfaction were closely related, making it difficult to determine the individual contribution of each dimension to student performance. In addition, the study was conducted with undergraduate students from a single university and examined only one ERPsim game, which may limit the generalizability of the results. The cross-sectional design also prevents conclusions about cause-and-effect relationships, and factors such as prior ERP experience, technical ability, motivation, or team dynamics may have influenced both students' perceptions and their performance. Future research should examine more diverse student populations, include different ERPsim scenarios, refine the measurement of user interaction satisfaction, and use longitudinal or experimental designs to better understand how specific aspects of the learning experience influence student outcomes.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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