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ORIGINAL

Evaluation of the Integrated University Information System at Universidad Técnica del Norte Using the DeLone and McLean Success Model

Evaluación del Sistema Informático Integrado Universitario de la Universidad Técnica del Norte utilizando el Modelo de Éxito de DeLone y McLean

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ABSTRACT

This study aims to evaluate the Integrated University Information System (SIIU) at Universidad Técnica del Norte by applying the DeLone and McLean Information Systems Success Model. The SIIU plays a crucial role in academic management by integrating key modules, such as executive, faculty, and student portfolios. Despite its long-standing implementation, a comprehensive assessment of the system's performance and its impact on academic activities had not been conducted until now. The research specifically focuses on assessing the SIIU's impact from the students' perspective, applying the six dimensions of the DeLone and McLean model: system quality, information quality, service quality, use/intention to use, user satisfaction, and net impacts. Four assessments were carried out over two years (May 2022, February 2023, July 2023, and July 2024), using a 28-item survey to measure these dimensions.
The findings confirm the validity of the DeLone and McLean model in evaluating information systems and reveal a positive trend in students' perceptions of the "SIIU – Student Portfolio" over the past years. The results also provide a detailed breakdown of the system's strengths, weaknesses, and areas for improvement, as experienced by students. These insights offer valuable guidance for the SIIU management team, facilitating targeted improvements to optimize the system's contribution to the university's academic environment.

Keywords: Evaluation; Impact; Information System; Success; Delone & McLean Model.

RESUMEN

Este estudio tiene como objetivo evaluar el Sistema Informático Integrado Universitario (SIIU) de la Universidad Técnica del Norte, aplicando el Modelo de Éxito de Sistemas de Información de DeLone y McLean. El SIIU desempeña un papel fundamental en la gestión académica al integrar módulos clave como los portafolios administrativo, docente y estudiantil. A pesar de su implementación desde hace varios años, hasta ahora no se había realizado una evaluación integral del rendimiento del sistema ni de su impacto en las actividades académicas. La investigación se centra específicamente en medir el impacto del SIIU desde la perspectiva de los estudiantes, aplicando las seis dimensiones del modelo de DeLone y McLean: calidad del sistema, calidad de la información, calidad del servicio, uso/intención de uso, satisfacción del usuario e impactos netos. Se realizaron cuatro mediciones a lo largo de dos años (mayo-2022, febrero-2023, julio-2023 y julio-2024), utilizando una encuesta de 28 ítems para evaluar estas dimensiones. Los resultados confirman la validez del

modelo de DeLone y McLean para evaluar sistemas de información y revelan una tendencia positiva en la percepción de los estudiantes sobre el "SIIU – Portafolio Estudiantil" en los últimos años. Además, proporcionan un análisis detallado de los aspectos positivos, negativos y neutrales del sistema, basado en las experiencias de los estudiantes. Estos hallazgos ofrecen una base objetiva para que el equipo de gestión del SIIU implemente las mejoras necesarias, optimizando así su contribución al entorno académico de la universidad.

Palabras clave: Evaluación; Éxito; Impacto; Sistemas de Información; Modelo de Delone & McLean.

INTRODUCTION

In today's academic landscape, it is common for Higher Education Institutions (HEIs) to utilize Information Systems (IS) for institutional management. The primary objective of an IS is to manage information related to students, faculty, and staff, while also facilitating communication within the academic community by providing valuable content and services.

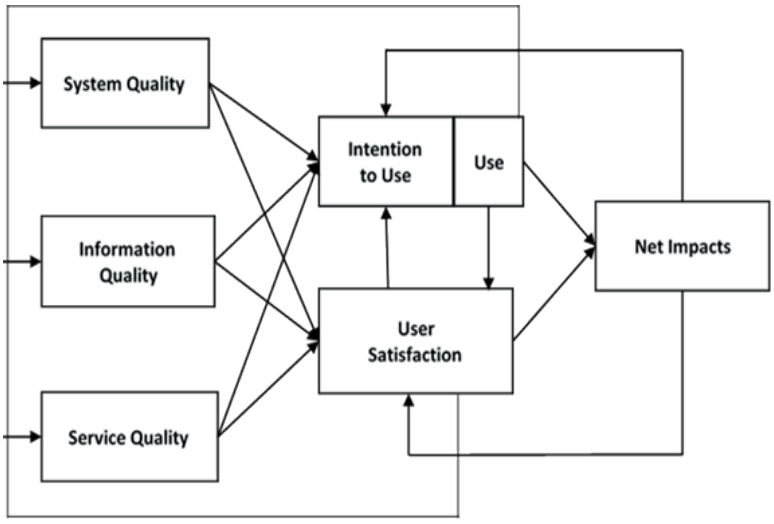
Understanding the flow of information managed by an IS highlights the critical importance of ensuring that the system is up-to-date, functional, and useful. This is essential for the efficient operation of an HEI, enabling better decision-making and enhancing the user experience.[1]

Moreover, Information Systems have become an essential need for institutions, leading them to implement automated systems to improve information management. Universities, in particular, generate vast and continuously growing volumes of data and information.

Academic information systems offer numerous advantages, including improved management of student data, enhanced communication between departments, centralized storage of stakeholder information, and seamless transfer of records across departments. These systems also provide a unified resource location for students, faculty, support staff, and administrators. Additionally, they standardize formats, facilitate the transfer of data to external entities, and reduce the time required to maintain and organize student records.[2]

Delone and McLean Information Systems Success Model.

The DeLone and McLean Information Systems Success Model is a framework for measuring and evaluating the success of information systems. Originally developed in 1992[3], the model was updated in 2003[4] to include six dimensions: System Quality, Information Quality, Service Quality, Use, User Satisfaction, and Net Benefits (DeLone & McLean, 2003). In the 2016 update, the word Net Benefits is changed to Net Impacts, as well as new relationships are created between Intention to use/use and user satisfaction with the main constructs[5] as shown in figure 1.



Source: DeLone & McLean, 2016.[5]

Figure 1. DeLone and McLean Information Systems Success Model

System Quality: the desirable characteristics of an information system. For example, ease of use, system flexibility, system reliability, ease of learning, and system features of intuitiveness, sophistication, flexibility, and response times.[3,4,5]

Information Quality: the desirable characteristics of the system outputs, i.e., management reports and Web

pages. For example, relevance, understandability, accuracy, conciseness, completeness, understandability, currency, timeliness, and usability.[3,4,5]

Service Quality: the quality of the support system users receives from the information systems organization and IT support personnel. For example, IT personnel staff's responsiveness, accuracy, reliability, technical competence, and empathy.[4,5]

Intention to use / Use: the degree and way employees and customers utilize the capabilities of an information system. For example, amount of use, frequency of use, nature of use, appropriateness of use, extent of use, and purpose.[4,5]

User Satisfaction: users' level of satisfaction with reports, Web sites, and support services. For example, a couple of the most widely used multi-attribute instruments for measuring user information satisfaction.[4,5]

Net Impacts: the extent to which information systems are contributing (or not contributing) to the success of individuals, groups, organizations, industries, and nations. For example, improved decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development.[5]

This model has been widely applied across various sectors, such as project monitoring and control systems in the construction industry[6], e-government systems[7], e-learning platforms [8], academic portals [1,2,9], healthcare platforms[10], as well as in banking and finance[11], among others. Researchers have used the DeLone and McLean model to measure and evaluate information system success by analyzing empirical studies and examining the relationships between the model's variables.[12]

Integrated University Information System

An Integrated University Information System is a digital platform designed to efficiently and centrally manage all operational and academic aspects of a university. This system is composed of various modules or portfolios tailored to meet the specific needs of different user groups within the institution. Below is a brief description of the primary portfolios:

Student Portfolio: this module allows students to manage their academic life. They can enroll in courses, consult their study plan, review grades, access educational materials, and complete administrative tasks such as applying for scholarships or certificates.

Teacher's Portfolio: faculty members use this module to manage their aca-demic responsibilities. It includes class scheduling, grade recording, publication of teaching materials, and communication with students. Additionally, faculty can access academic performance reports and participate in faculty evaluations.

Administrative Portfolio: this portfolio is aimed at the university's administrative staff. It facilitates the management of processes such as enrollment, certificate issuance, human resources management, and budget and finance control.

Authorities Portfolio: designed for university executives, this module pro-vides tools for strategic decision-making. It includes access to institutional performance reports, quality indicators, resource management, and long-term planning.

Directors' Portfolio: similar to the authorities' portfolio but focused on man-aging specific faculties or departments. It enables faculty or department directors to manage faculty staff, coordinate academic programs, and ensure the achievement of academic goals and standards.

Alumni Portfolio: this module focuses on the university's graduates. It offers services such as updating personal information, accessing alumni networks, consulting job opportunities, and managing processes related to the issuance of degrees and diplomas.

This Integrated University Information System facilitates interaction among all members of the university community, enhances operational efficiency, and ensures a smooth and reliable flow of information, thereby contributing to the achievement of the institution's academic and administrative objectives.

After reviewing the background, we proceed to describe the structure of the article. The article begins with a review of the state of the art concerning the measurement of university information systems using the DeLone and McLean model. This is followed by a description of the research process applied, the results obtained, the conclusions and recommendations made, and finally, a discussion of future work.

State of the art

Universities are increasingly implementing information systems to enhance organizational processes and performance, though their impact remains complex. While these systems have the potential to boost productivity, facilitate decision-making, and increase overall user satisfaction[13], they can also lead to shifts in power dynamics within institutions, often favoring central non-academic departments over academic staff.[14] The successful integration and maintenance of these systems depend heavily on effective post-implementation

strategies.[15]

Specific information systems, such as R&D management systems, data warehouses, and decision support systems, have been shown to positively impact university rankings in international assessments.[16] However, challenges such as user-unfriendly interfaces and the need for specialized personnel to address technical issues persist.[14] To foster a more supportive environment for the adoption of modern systems, increased awareness and targeted training on the utility of these systems are recommended.[13]

One of the existing challenges is the lack of understanding regarding how students perceive the performance of institutional platforms. Therefore, it is crucial to comprehend how students use educational management information systems, and the net impacts these systems generate.[9] Additionally, it is essential to deepen the understanding of the factors that influence students' behavioral intentions to continue using university information systems in the future.[17]

According to Balaban et al.[18], the success model of an academic portfolio can also contribute to the improved implementation and utilization of academic portfolio systems by analyzing the causal relationships among its various dimensions. For instance, if user satisfaction is identified as a problematic dimension through the D&M model instrument, the institution may realize that it first needs to enhance service quality and possibly system quality to improve the benchmark for user satisfaction.

Moreover, from a managerial perspective, the D&M model enables managers, coordinators, and university IT staff to ensure that the educational management information system provides high-quality information in a structured and coordinated manner. Simultaneously, it emphasizes the importance of having a support service fully capable of assisting students when they encounter difficulties using the system.[9]

Regarding the application of the D&M model, Vega et al.[19] note that it has been utilized across various fields, with reports of its use in healthcare systems, e-government, e-learning applications, blogs, online shopping, industrial information systems, mobile banking, call centers, and more. For example, in a study by Akrong et al.[20], the success of a tax ERP system is evaluated using the D&M model, which integrates variables such as organizational climate, role clarity, teamwork, capability, and learning.

METHOD

This study was conducted using a quantitative research approach based on surveys. A questionnaire was employed to collect data, grounded in the DeLone & McLean (D&M) Information Systems Success Model. Data collection was conducted with students from Universidad Técnica del Norte over four distinct periods: May 2022, February 2023, July 2023, and July 2024. For the sample calculation, data from the university's website - UTN en cifras (https://utn.edu.ec) - was used, which provides the number of students enrolled per academic cycle. Also, We utilized the questionnaire from the article "Assessing the success behind the use of education management information systems in higher education".[9] This questionnaire consists of 28 items, measured on a Likert scale ranging from "1 - strongly disagree" to "5 - strongly agree". Table 1 presents this questionnaire.

Table 1. Questions by dimension of the questionnaire

No	Dimension	Question	Likert Scale				
			1	2	3	4	5
1	System quality	Is the student portfolio easy to learn?					
2		Does the student portfolio have help functions and are they sufficient?					
3		Is the student portfolio organized and clearly displays the available content?					
4		Does the student portfolio have a user-friendly and easy-to-understand interface?					
5		Is the student portfolio always working when I need it?					
6	Information quality	Does the student portfolio include the necessary features and functions to manage your academic tasks?					
7		Does the student portfolio provide comprehensive information?					
8		Does the student portfolio provide up-to-date information?					
9		Does the student portfolio provide relevant information?					
10		Does the student portfolio provide information that is easy to understand?					
11	Service quality	The institutional email and online help channels are available in case of problems with the use of the Integrated University Information System.					
12		The support staff or administrators of the System provide assistance when issues arise with the use of the integrated system.					
13		The support staff or administrators of the System are competent when responding to questions related to the integrated system.					
14		The university institution provides individual attention to the student in case of problems with the System.					
15		The support staff or administrators of the System are always willing to help.					

16	Intention to Use / Use	While using the SIIU, I use the available features to organize my content.
17		When using the SIIU, I collaborate with my classmates or professors.
18		While using the SIIU, I use features that help me join specific study groups or curricular units.
19	User satisfaction	Do I like using the Teaching Portfolio?
20		Does the Student Portfolio make academic work or management (submission of assignments, evaluation, etc.) more interesting?
21		Is using the Student Portfolio a good idea?
22		Do I find the Student Portfolio useful for learning?
23		Are the capabilities of the Student Portfolio (e.g., fast loading, formatting and presentation of personal information, access to content, etc.) satisfactory?
24	Net Impacts	Does the Student Portfolio encourage me to develop a positive attitude towards lifelong learning?
25		Does the Student Portfolio help me establish connections between formal learning experiences (i.e., structured learning within the faculty) and informal learning (i.e., unstructured learning that occurs in everyday life)?
26		Does the Student Portfolio help me meet learning outcomes?
27		Does the use of the Student Portfolio lead to greater transparency in academic assessment?
28		Can I showcase my growth and personal development over time in the Student Portfolio?"

Source: Martins et al.(9)

Survey May 2022

This study began as a classroom project with eighth-semester students from the Software Engineering program, in the course Implementation of Enterprise Information Systems. The objective of the study was to gain first-hand insight into the students' perceptions of the academic system (SIIU), which they are required to use. To calculate the sample size in 2022, we reviewed the number of students enrolled in the March-August 2022 term, which totaled 9439 students. We applied a confidence level of 95,75 % and a margin of error of 5 %, resulting in a sample of 395 students. For student selection, we employed a simple random sampling method stratified by faculty (5 faculties), using a list provided by the IT department.

The survey was conducted online through the Microsoft Forms platform. A link was provided to each participant in the selected sample, along with a detailed explanation of the study's objective, requesting their voluntary participation. Participants were assured that their responses would be confidential, and a one-week deadline was set for completing the survey.

Survey February 2023

Like the previous survey, this classroom project aimed to measure a second perception that students had regarding the SIIU. The sample was based on students enrolled in the September 2022 – February 2023 academic term. During this term, a total of 9726 students were enrolled in the in-person modality. Applying a confidence level of 96,00 % and a margin of error of 5 %, a sample size of 405 students was obtained. A simple random sampling method was used to select the sample. The sample was divided into five groups according to the faculty to which each student belonged at the university: FICA, FICAYA, FECYT, FACAE, and FCCSS. It was ensured that each group had a representative proportion of the total population. The survey was conducted online through the Microsoft Forms platform.

Survey July 2023

For this survey, the University's Department of Information Technology and Systems was involved with the intention of publishing the questionnaire's URL, hosted on Microsoft Forms, directly in the SIIU. First, the wording of the questions was reviewed to improve comprehension among the respondents. This questionnaire was published during the last two weeks of the March-August 2023 academic term and was directed at all students enrolled in in-person, hybrid, and online modalities. A total of 4606 responses were collected, representing 37,75 % of the enrolled student population.

Survey July 2024

As with the July 2023 survey, we worked directly with the University's IT department. The same 2023 questionnaire was retained, and the URL was published on the academic system during the final week of the March-August 2024 academic term. A total of 11613 students were enrolled during this period across in-person, hybrid, and online modalities. This questionnaire received 804 responses from enrolled students, representing 6,5 % of the student population. By applying the formulas to determine sample size, we deduced a confidence

level of 97 % with a margin of error of 3,822 %.

RESULTS

In this section, we present the results of the surveys conducted over the four moments using the DeLone and McLean Information Systems Success Model to assess the impacts of the integrated university information system — student portfolio. First, we begin by demonstrating the reliability of the collected data using Cronbach's Alpha. Following this, taking advantage of the significant number of responses obtained in the third and fourth surveys (4,606 and 804, respectively), we performed a Structural Equation Modeling (SEM) analysis to confirm whether the DeLone and McLean model holds as proposed. Lastly, we conducted a longitudinal analysis by dimension to demonstrate the impact that the SIIU has had on the university in recent times.

Cronbach's Alpha

Cronbach's Alpha was used to measure the reliability of the data obtained in the four questionnaires for each dimension of the DeLone and McLean model, yielding the results shown in table 2. According to Tavakol and Dennick[21], a range of 0,7 to 0,90 suggests good internal consistency of the data.

Table 2. Cronbach's alpha by dimension of surveys conducted

	Survey may 2022	Survey feb 2023	Survey july 2023	Survey july 2024
System quality	0,812	0,912	0,923	0,919
Information quality	0,859	0,923	0,950	0,953
Service quality	0,805	0,924	0,954	0,959
Intention to use / use	0,888	0,859	0,919	0,909
User satisfaction	0,859	0,926	0,912	0,887
Net impacts	0,846	0,914	0,960	0,954

Structural Equation Modeling (SEM) analysis

With the data obtained from the surveys conducted with students in July 2023 (4,606) and July 2024 (804), a Structural Equation Modeling (SEM) analysis was performed. This is an advanced statistical technique that allows for the analysis of complex relationships between observed and latent variables.[22] Figure 2 presents the analysis of the July 2023 survey, and figure 3 presents the analysis of the July 2024 survey. When analyzing the SEM (Structural Equation Modeling) results conducted in Amos for the student surveys in July 2023 and July 2024, the following observations can be made:

Model Fit Comparison:

CFI (Comparative Fit Index): In both cases, the CFI value is above 0,95, indicating a good model fit. For the 2023 survey, the CFI is 0,964, while for the 2024 survey, it is slightly lower at 0,954. Both values exceed the 0,90 threshold, implying that the models have an acceptable fit in both surveys.

RMSEA (Root Mean Square Error of Approximation): The RMSEA is 0,060 for the 2023 survey and 0,067 for the 2024 survey. Both values fall within the acceptable range (below 0,08), indicating that the approximation errors in the models are low and that the models represent the data well.

Latent and Observed Variables:

In both models, the key latent variables (System Quality, Information Quality, Service Quality, Use, User Satisfaction, and Net Impacts) are well-defined and show strong factor loadings on their respective observed items. This indicates that these variables are well-represented by the questionnaire items.

The factor loadings of the observed variables in both surveys are mostly above 0,7, indicating that the observed items have a high correlation with the latent variables and contribute significantly to the measurement of the constructs.

Relationships between Latent Variables:

In both models, the strongest relationships are found between System Quality and Information Quality and User Satisfaction (0,95 in the 2023 survey and 0,79 in the 2024 survey). This indicates that students' perceptions of system and information quality have a significant impact on their overall satisfaction.

The relationship between Use and User Satisfaction is significant in both models, but the coefficient is notably higher in the 2023 model (0,95) compared to 2024 (0,79). This suggests a possible decrease in satisfaction with system use in 2024.

The direct impact of User Satisfaction on Net Impacts is strong in both years, with a coefficient of 0,91 in

2023 and 0,94 in 2024. This indicates that students' satisfaction has a significant direct impact on the outcomes that the system generates in the university environment.

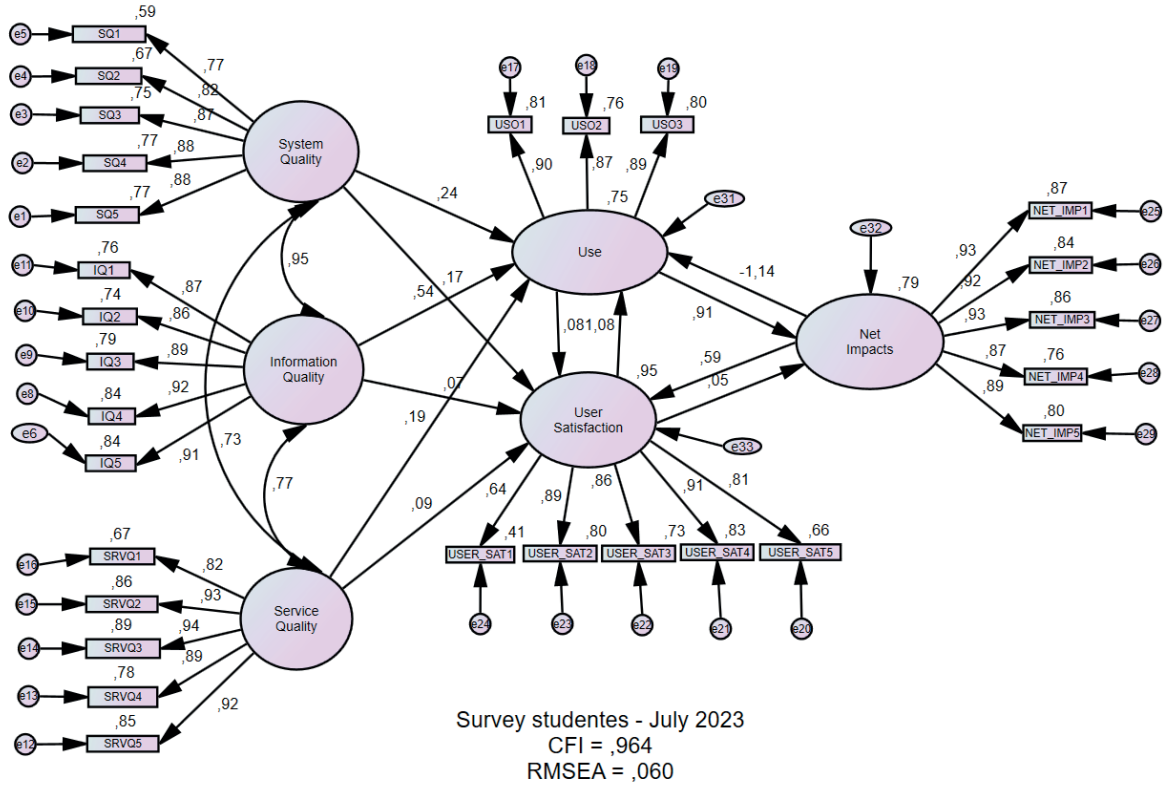


Figure 2. SEM Analysis of the 2023 Student Surveys

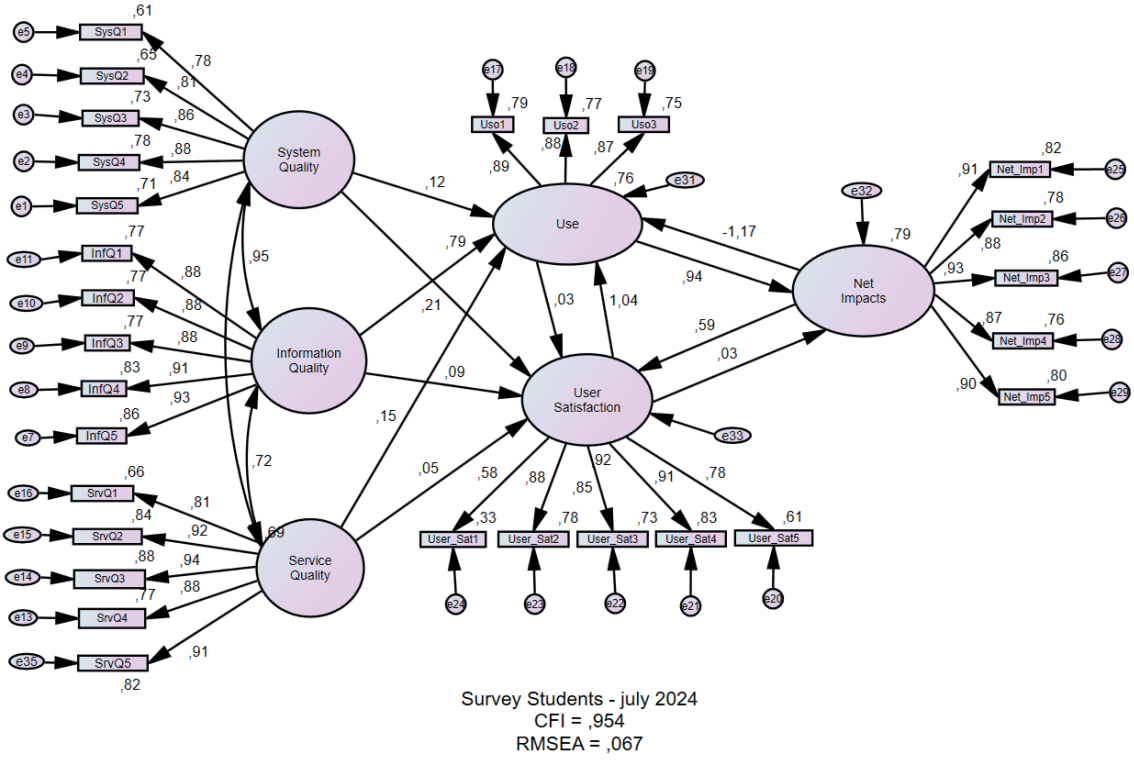


Figure 3. SEM Analysis of the 2024 Student Surveys

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Longitudinal Analysis by Dimension of the DeLone and McLean Model

To interpret the survey responses, the results were grouped into positive (Strongly Agree, Agree), neutral, and negative (Strongly Disagree, Disagree) categories. These results are then expressed as percentages. Table 3 presents the results for each question, grouped by dimension according to the DeLone and McLean model. At the end of each dimension, the average is provided. These averages are used to conduct the analysis by dimension, followed by a general analysis of the four surveys.

Table 3. Results by question and dimension from the surveys conducted with students

No	May 2022			Feb 2023			Jul 2023			Jul 2024		
	pos	neu	neg	pos	neu	neg	pos	neu	neg	pos	neu	neg
System quality												
1	65,2	26,9	7,9	74,2	13,5	12,1	82,9	12,6	4,5	84,3	10,5	5,1
2	50,4	37,4	12,1	64,0	17,9	18,1	67,3	22,7	10,1	70,1	20,1	9,7
3	49,4	36,8	13,8	75,4	10,6	14,0	78,7	14,7	6,6	82,9	11,1	6,1
4	61,6	30,2	8,3	60,6	19,6	19,8	77,7	15,2	7,1	78,8	14,7	6,4
5				67,1	17,1	15,7	77,0	16,4	6,6	76,9	17,3	5,8
Total	56,7	32,8	10,5	68,2	15,7	15,9	76,7	16,3	7,0	78,6	14,7	6,6
Information quality												
6	69,4	26,1	4,4	67,2	15,2	17,6	75,0	18,0	7,0	77,4	16,4	6,2
7	68,5	26,5	5,0	64,7	17,9	17,4	75,5	17,3	7,1	74,6	18,7	6,7
8	57,7	32,4	9,9	75,1	14,0	10,9	75,7	18,1	6,2	77,9	15,5	6,6
9	69,3	25,9	4,9	70,3	18,4	11,4	78,9	16,1	5,0	75,1	18,7	6,2
10				78,0	11,8	10,1	78,2	16,0	5,8	80,7	13,6	5,8
Total	66,2	27,7	6,1	71,1	15,5	13,5	76,7	17,1	6,2	77,1	16,6	6,3
Service quality												
11	55,7	36,6	7,7	62,3	18,4	19,3	71,0	19,1	10,0	69,7	20,1	10,1
12	36,9	41,7	21,5	55,3	24,4	20,3	66,4	21,9	11,7	66,3	22,8	10,9
13	45,6	32,2	22,3	58,5	20,8	20,8	67,9	22,1	10	68,0	22,5	9,5
14	52,6	35,6	11,7	59,9	22,9	17,1	59,8	25,8	14,4	58,8	28,2	13,0
15				60,9	21,3	17,9	66,6	23,2	10,2	69,1	21,3	9,6
Tot	47,7	36,5	15,8	59,4	21,6	19,1	66,3	22,4	11,2	66,4	23,0	10,6
Itention to use / Use												
16	46,7	41,3	11,9	64,7	20,3	15,0	81,1	14,1	4,8	83,9	11,8	4,2
17	57,5	33,6	8,9	67,6	17,1	15,2	80,5	14,9	4,6	83,3	11,7	5,0
18	63,8	29,8	6,5	60,1	21,0	18,8	81,3	13,8	5,0	82,1	11,7	6,2
Tot	56,0	34,9	9,1	64,1	19,5	16,3	81,0	14,2	4,8	83,1	11,8	5,1
User satisfaction												
19	46,0	44,1	9,9	66,9	17,9	15,2	62,5	22,6	14,9	58,8	25,8	15,4
20	56,7	35,6	7,7	63,8	18,6	17,6	73,5	18,5	8,0	73,0	19,1	7,9
21	51,2	39,7	9,1	71,5	16,4	12,1	81,7	13,8	4,5	83,4	12,8	3,8
22				65,2	21,7	13,0	76,4	17,4	6,3	78,8	16,1	5,1
23				52,9	19,1	28,0	68,4	20,0	11,6	67,8	21,3	10,9
Total	51,3	39,8	8,9	64,1	18,7	17,2	72,5	18,5	9,0	72,4	19,0	8,6
Net impacts												
24	52,4	33,0	14,5	59,9	24,2	15,9	73,4	19,8	6,8	75,7	18,7	5,7
25	45,8	41,7	12,5	58,0	24,2	17,9	71,9	20,9	7,2	72,2	21,2	72,2
26	57,9	34,6	7,5	64,5	21,5	14,0	75,9	18,3	5,8	78,3	17,1	4,6
27	44,8	38,7	16,6	68,1	19,8	12,1	77,2	16,9	5,9	79,6	16,1	4,3
28	51,2	39,1	9,7	52,4	26,6	21,0	77,7	16,8	5,6	79,3	15,8	4,9
Total	50,4	37,4	12,2	60,6	23,3	16,2	75,2	18,6	6,2	77,0	17,8	5,2

Based on the data (table 3) from the four surveys conducted between May 2022 and July 2024, the analysis of the University Integrated Information System (SIIU) using the DeLone and McLean Information Systems Success Model shows improvements in all six dimensions.

System Quality: the perception of system quality has significantly improved over time, with positive responses increasing from 56,7 % in May 2022 to 78,6 % in July 2024. Negative responses decreased from 10,5 % to 6,6 % over the same period, indicating that students perceive the system as more reliable and functional. The neutral

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responses have also steadily declined, showing greater overall satisfaction with the system's performance.

Information Quality: information quality has remained consistently high, increasing from 66,2 % in May 2022 to 77,1 % in July 2024. The percentage of negative responses remained low, fluctuating slightly around 6 %, while neutral responses stayed stable, indicating that the system continues to provide accurate and valuable information to students.

Service Quality: the perception of service quality has shown a substantial improvement, with positive responses rising from 47,7 % in May 2022 to 66,4 % in July 2024. Negative responses decreased from 15,8 % to 10,6 %, suggesting that support services have improved over time. However, neutral responses remain relatively high, indicating that there is still room for improvement in the system's support and service components.

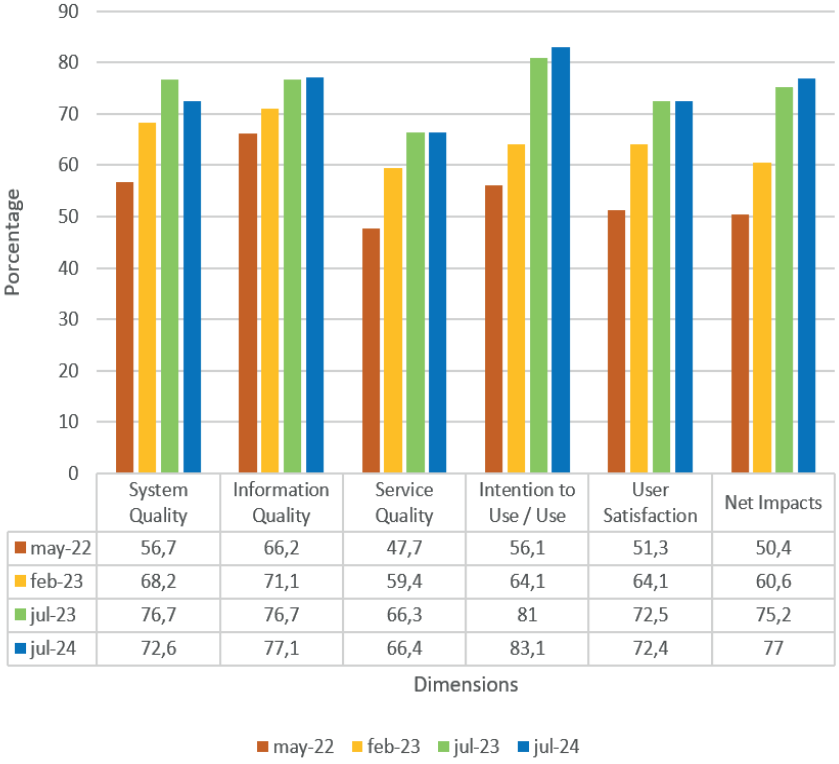
Intention to Use / Use: this dimension saw the most significant improvement, with positive responses increasing from 56,1 % in May 2022 to 83,1 % in July 2024. Negative responses dropped from 9,3 % to 5,1 %, demonstrating that the system has become more integral to students' academic activities. This shows that students are increasingly adopting the system and finding it more useful over time.

User Satisfaction: user satisfaction saw a steady increase, growing from 51,3 % in May 2022 to 72,4 % in July 2024. Negative responses decreased from 17,2 % to 8,6 %, reflecting improved satisfaction with the system's overall performance. However, neutral responses remain around 19 %, suggesting that some students are still ambivalent about the system's benefits, pointing to areas that need further refinement.

Net Impacts: the perceived net impacts of the system saw a strong upward trend, with positive responses increasing from 50,4 % in May 2022 to 77,0 % in July 2024. Negative responses dropped significantly from 12,2 % to 5,2 %, indicating that students increasingly recognize the system's positive impact on their academic success and overall experience. Neutral responses remain relatively stable but could decrease further with continued improvements.

General Analysis of the Four Surveys

Overall, the four surveys show consistent and significant improvements across all dimensions of the DeLone and McLean model (figure 4). The System Quality and Information Quality dimensions reflect strong and stable gains, highlighting the reliability and accuracy of the system. Service Quality has improved but still shows potential for enhancement, as neutral responses remain relatively high. The Intention to Use dimension shows the most substantial positive shift, indicating increasing reliance on the system by students. User Satisfaction has improved but still shows some neutrality, suggesting opportunities for further improvements in usability and support. Finally, the Net Impacts demonstrate that the system is delivering measurable benefits to the university and its students, reinforcing its growing success. Overall, while the SIIU has made clear progress, continued efforts to refine service and satisfaction could further enhance the system's effectiveness and adoption.



	System Quality	Information Quality	Service Quality	Intention to Use / Use	User Satisfaction	Net Impacts
may-22	56,7	66,2	47,7	56,1	51,3	50,4
feb-23	68,2	71,1	59,4	64,1	64,1	60,6
jul-23	76,7	76,7	66,3	81	72,5	75,2
jul-24	72,6	77,1	66,4	83,1	72,4	77

Figure 4. Annual evolution of positive aspects of the SIIU - Students

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The evolution of the SIIU (figure 5), analyzed using the DeLone and McLean success model, demonstrates positive development across all dimensions. System quality shows steady growth until July 2023, followed by a slight decline. Information quality improves gradually and stabilizes at high levels (~78 %), while service quality increases but plateaus around 65 %. Intention to use exhibits a sharp rise, reaching its peak (~85 %), driving both user satisfaction and net benefits, which grow significantly and stabilize near 78 %. Overall, SIIU – Students has successfully met user expectations and generated positive impacts, although service quality remains an area for improvement to consolidate its long-term success.

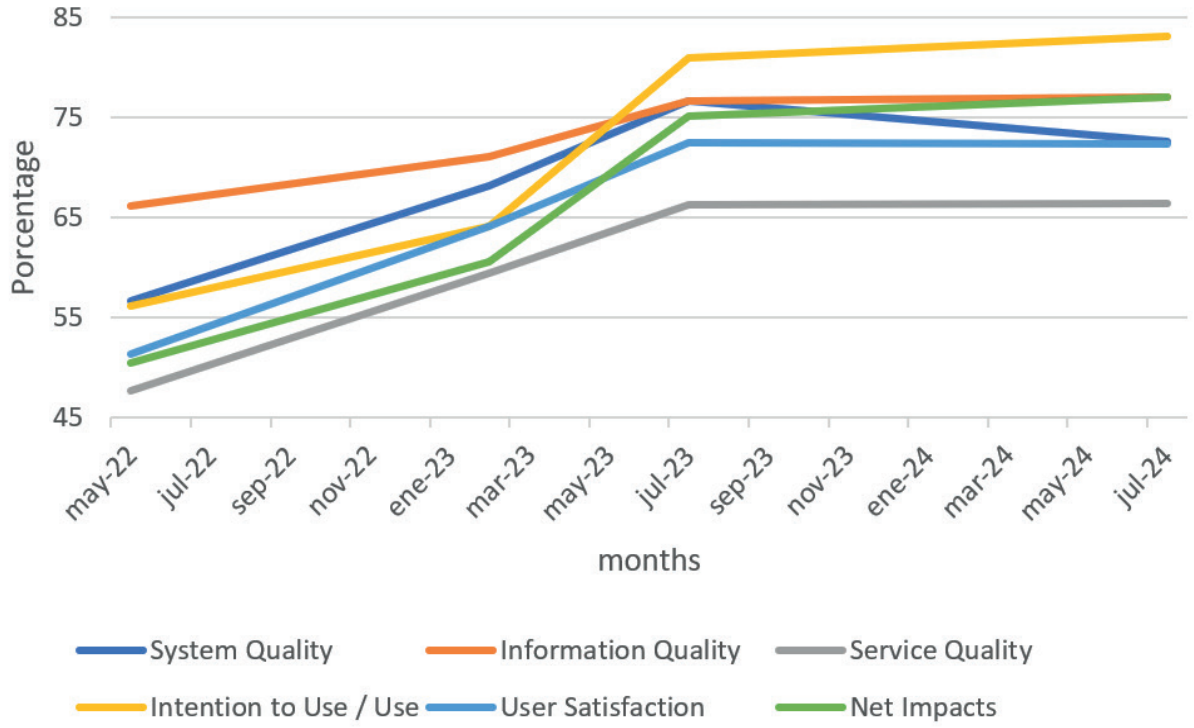

Figure 5. Evolution of SIUU – Students by dimension

DISCUSSION

When examining the SEM (Structural Equation Modeling) figures 2 y 3, a negative relationship between "Net Impacts" and "Use" is notable, with negative coefficients. This result is unusual compared to the expected behavior in the DeLone and McLean Information Systems Success Model, where higher system usage is typically associated with greater net impacts—meaning a positive effect on both the organization and user outcomes. This finding suggests the need for a deeper evaluation of how students are using the system and how these net impacts are being perceived.

CONCLUSIONS

The model was validated using Structural Equation Modeling (SEM), showing a good fit with the DeLone and McLean Information Systems Success Model. However, it is important to highlight an unusual relationship between "Net Impacts" and "Use," which was negative in both the July 2023 and July 2024 surveys. This negative relationship suggests that as the system's impacts increase, usage tends to decrease, a phenomenon that warrants deeper analysis to understand the reasons behind this behavior.

The University Integrated Information System (SIIU) has demonstrated significant improvements across all six dimensions evaluated, according to the DeLone and McLean model, based on the results of the surveys conducted between May 2022 and July 2024. These improvements encompass system quality, information quality, service quality, intention to use, user satisfaction, and net impacts, with a notable increase in positive responses and a decrease in negative ones. This reflects greater student satisfaction and system adoption, highlighting the effectiveness of the system's updates and adjustments.

Despite the improvements, service quality remains an area for further enhancement by the IT Department at the Universidad Técnica del Norte (UTN). While progress has been made, there is still room to improve user support and service delivery to optimize the overall student experience and maximize the system's value.

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CONFLICT OF INTEREST

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