Development of Informative Reports for Analysis of Student Admission, Case Studies for the Faculty of Industrial Education and Technology, KMUTT

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Abstract

Before Covid-19 crisis, the results of undergraduate admission were reported using paper-base with raw data. As a result, the administrators were unable to apply the unclear information for decision in a timely manner. This case study was performed by the academic affair of the Faculty of Industrial Education and Technology, King Mongkut's University of Technology Thonburi (KMUTT), Thailand. The undergraduate admission process was analyzed in group discussion according to the SIPOC model, found that administrators as suppliers wanted to get the dashboards of informative reports which must be accurate and up to date. The online informative reports were then developed using Looker Studio program to make the big data easier to determine for student admission management. The dashboards could display various information such as number of applicants in each academic year, round, academic programs, and category. The system could show grade point average and school of applicants, and which programs or categories were the most interested. There are usually 4 rounds of admission by Thai University Central Admission System (TCAS) for 8 undergraduate programs in an academic year with >10 categories, resulting in big data analysis. After applying the Looker Studio program to present the online informative reports for 5 academic years since 2019, the satisfaction of administrators and related staffs as the target group was evaluated using online questionnaire with 5-point Likert scale. The opinion of 22 respondents showed that they were strongly agree with the online informative reports which are very appropriate to understand and analyze.

Keywords: Looker Studio, Faculty of Industrial Education and Technology, Thai University Central Admission System (TCAS)

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Introduction

King Mongkut's University of Technology Thonburi can trace its origin to the Thonburi Technical College (TTC) which was established on 4 February 1960, by the Department of Vocational Education, Ministry of Education. TTC had the mission of training technicians, technical instructors, and technologists. By the Technology Act, enacted on 21 April 1971, three technical institutes are under the Department of Vocational Education: Thonburi Technical Institute (TTI), North Bangkok Technical Institute, and Nonthaburi Telecommunication Institute. They were combined to form one degree-granting institution under the name King Mongkut's Institute of Technology (KMIT) spread across three campuses. TTC thus became KMIT Thonburi campus. In 1974, KMIT was transferred from the Ministry of Education to the Ministry of University Affairs. A new technology act was enacted on 19 February 1986: the three campuses of KMIT became three autonomous institutes, each having university status. KMIT Thonburi campus became King Mongkut's Institute of Technology Thonburi (KMITT). Now KMUTT KMUTT has the following Faculties and Schools Faculty of Engineering (FoE), Faculty of Science (FSci), Faculty of Industrial Education and Technology (FIET), School of Liberal Arts (SoLA), School of Information Technology (SIT), School of Architecture and Design (SoA+D), School of Energy Environment and Materials (SEEM), School of Bioresources and Technology (SBT), Join Graduate School of Energy and Environment (JGSEE), Institute of Field Robotics (FIBO), Graduate School of Management and Innovation (GMI) and College of Multidisciplinary Sciences [1].

The Faculty of Industrial Education and Technology (FIET) has 3 degrees Bachelor's Degree, Master's Degree, and Doctoral Degree is total of 18 programs. The Bachelor's Degree has 8 programs Civil Engineering, Mechanical Engineering, Electrical Engineering, Production Engineering, Packaging and Printing Technology, Applied Computer Science-Multimedia, Industrial Technology and Education, Technology, and Mass Communication. The Master's Degree has 7 programs composed of a Master of Science in Industrial Education Program in Mechanical Engineering, Electrical Engineering, Production Engineering, Civil Engineering, Learning Technology and Mass Communication, Computer and Information Technology, and a Program in Packaging Technology and Printing Innovation. Also, the Doctoral Degree has 1 program such as the Doctor of Philosophy Program in Learning Innovation and Technology.

Application channels for students to bachelor's degree programs of the Faculty of Industrial Education and Technology depend on the Thai University Central Admission System (TCAS). It has 4 rounds to apply, and another round has many projects such as:

Round 1: Portfolio has 3 projects to apply such as Active Recruitment 1st, Direct Admission for Academic Excellency and Direct Admission for Gifted Student and Pra Jom Klao Scholarship

Round 2: Quota has 7 projects to apply such as Active Recruitment 2nd, Direct Admission for Vocational Certificate Students, Quota for Printing and Packaging Business Successor, Direct Admission for Development of Teachers' Descendants, Direct Admission with TGAT/TPAT for good students with morals, Direct Admission with TGAT/TPAT for Expanding Educational Opportunity and Direct Admission for producing the personnel in Science Technology and Innovation

Round 3: Admission has 1 project by the Thai University Central Admission System

Round 4: Direct Admission has 2 projects such as Active Recruitment 3rd and Direct Admission for producing the personnel in Science, Technology, and Innovation

The reporting of past student admissions results has traditionally been conducted using paper methods, relying on big data and raw data that may lead to unclear and unanalyzable information. This applies to various aspects such as school data, GPAX (Grade Point Average), field applications, and round and project applications, among others. The use of paper-based methods hinders the effective and prompt utilization of the data. As a result, there is a recognized need to develop a more efficient student admission reporting process. This development involves the creation of informative reports designed for the analysis of student admissions. The goal is to ensure that the reported data is accurate and up to date, with clear references to data sources and survey times. The reporting process aims to be comprehensive, covering a wide range of topics and subjects. It also prioritizes speed and timeliness to facilitate immediate utilization of the data. Additionally, this research initiative extends beyond reporting to address the design and development of the curriculum within the Faculty of Information Technology and Electrical Engineering (FIET). The purpose is to inform the executives of FIET, enabling them to strategically plan the faculty's curriculum design to better meet the needs of the students. This comprehensive approach aims to enhance the overall effectiveness and responsiveness of the student admission reporting process and curriculum development within IFET.

Objective

This research had3 objectives for Development of Informative Reports for Analysis of Student Admission, Case studies for the Faculty of Industrial Education and Technology, KMUTT.
1. To develop the undergraduate student admissions reporting system into an information format.
2. To assess the effectiveness the undergraduate student admissions reporting system into an information format.
3. To evaluate the satisfaction the undergraduate student admissions reporting system into an information format.

Methodology

Step 1: Study the Current Data Situation Through SIPOC Model

Utilize the SIPOC (Supplier, Input, Process, Output, Customer) By the result Executive of FIET, they want to information report not data report.

SIPOC = Model as a tool for analyzing and understanding the current data processes. This model helps define the relationships between suppliers, inputs, processes, outputs, and customers, providing insights into the workflow.

Step 2: Study Standardized Information Reporting Systems

Investigate information reporting systems that adhere to standards. This can involve exploring methods such as Business Intelligence tools, dashboards, and Key Performance Indicators (KPIs) to ensure reliable and decision-worthy data. I choose the Looker studio because Looker Studio is update information real time.

Step 3: Design and Plan Existing Data for Reporting System Integration

Designing and planning existing data involves considering user requirements and organizing data systems to efficiently support reporting. This includes structuring data to enhance its usability within the reporting framework by Google Sheet.

Step 4: Implement a Reporting System, Develop Quality Assessment Models and Satisfaction Surveys (Seeking Quality)

Create a reporting system with defined Key Performance Indicators (KPIs) and develop assessment models to measure the efficiency of the system. Additionally, design satisfaction surveys to gauge user contentment and quality by Looker Studio.

Step 5: Evaluate System Quality by Experts and Assess User Satisfaction With the System

5.1 Evaluate System Quality by Experts
The Purposive Sampling by experts who can employ various methods such as system testing, code reviews, and peer assessments to identify areas for improvement and refinement.

Main Topics	Main Topis
Satisfaction of Informative Report	- Suitable Data - User-Friendly - Appropriate Reporting of Results

Table 1: The contents for satisfaction evaluation in Questionnaire

5.2 Assess User Satisfaction with the System
Reporting the results of undergraduate student admissions in the past has been done using paper, and the reports consist of raw data. This has led to unclear information for the recipients, making it challenging for them to quickly and effectively utilize the data for further purposes.

Main Topics	Sub-topics
Suitable Data	- Data Accuracy - Data Completeness - Usability of Data for Beneficial Purposes
Report System	- User Friendly - Appropriate Reporting of Results

Table 2: The contents for satisfaction evaluation in Questionnaire

Step 6: Evaluate Satisfaction with the System

6.1   Statistical Measures Used for Evaluation:
6.2   Data Analysis Procedures:
6.2.1 Analysis of Survey Data:
       Calculating the mean ($\bar{x}$) and standard deviation (SD) for quantitative analysis.
6.2.2 Scoring Based on Boonchom's Concept (2013):

Evaluating responses according to Boonchom's framework, where scores are assigned on a scale of 1 to 5, representing the levels of excellence, high satisfaction, moderate satisfaction, low satisfaction, and the lowest satisfaction, respectively.

6.2.3 Interpretation of Satisfaction Levels:
Interpreting the analysis results based on user satisfaction criteria:
Mean scores of 4.51–5.00 indicate the highest satisfaction.
Mean scores of 3.51–4.50 indicate high satisfaction.
Mean scores of 2.51–3.50 indicate moderate satisfaction.
Mean scores of 1.51–2.50 indicate low satisfaction.
Mean scores of 1.00–1.50 indicate the lowest satisfaction.

Results

From the comparison of the traditional undergraduate student admission reporting method is shown in Figure 1, it can be observed that the data presentation consists solely of tables indicating the number of candidates who passed the selection process for each project within each academic program. However, with the development of the new format for reporting undergraduate student admission outcomes (Figures 2 and 3), it provides detailed information. This includes applicant data, interviewee information, system-verified data, Teacher's Council data, King Mongkut's University data, and applicant data for all academic disciplines and projects. The data is categorized according to application types, applicant's school names, chosen academic programs, and applied projects. This enables users to effectively utilize the data for strategic planning, defining admission strategies for undergraduate students, and future curriculum development.

Figure 1: Undergraduate Student Admission Outcome Reporting (Traditional Format)
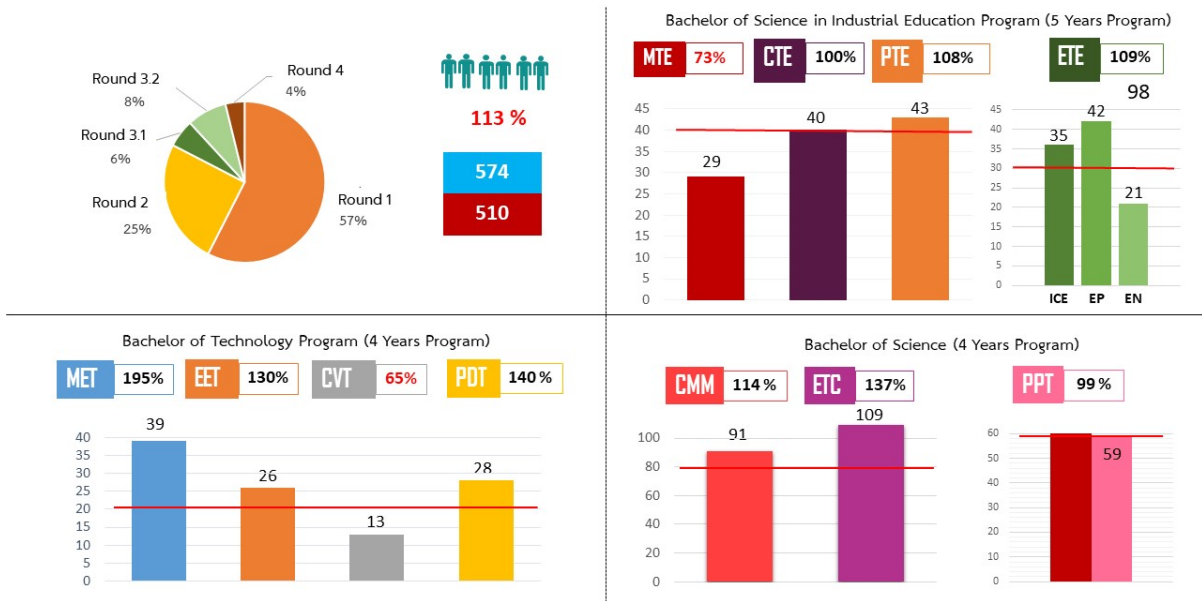
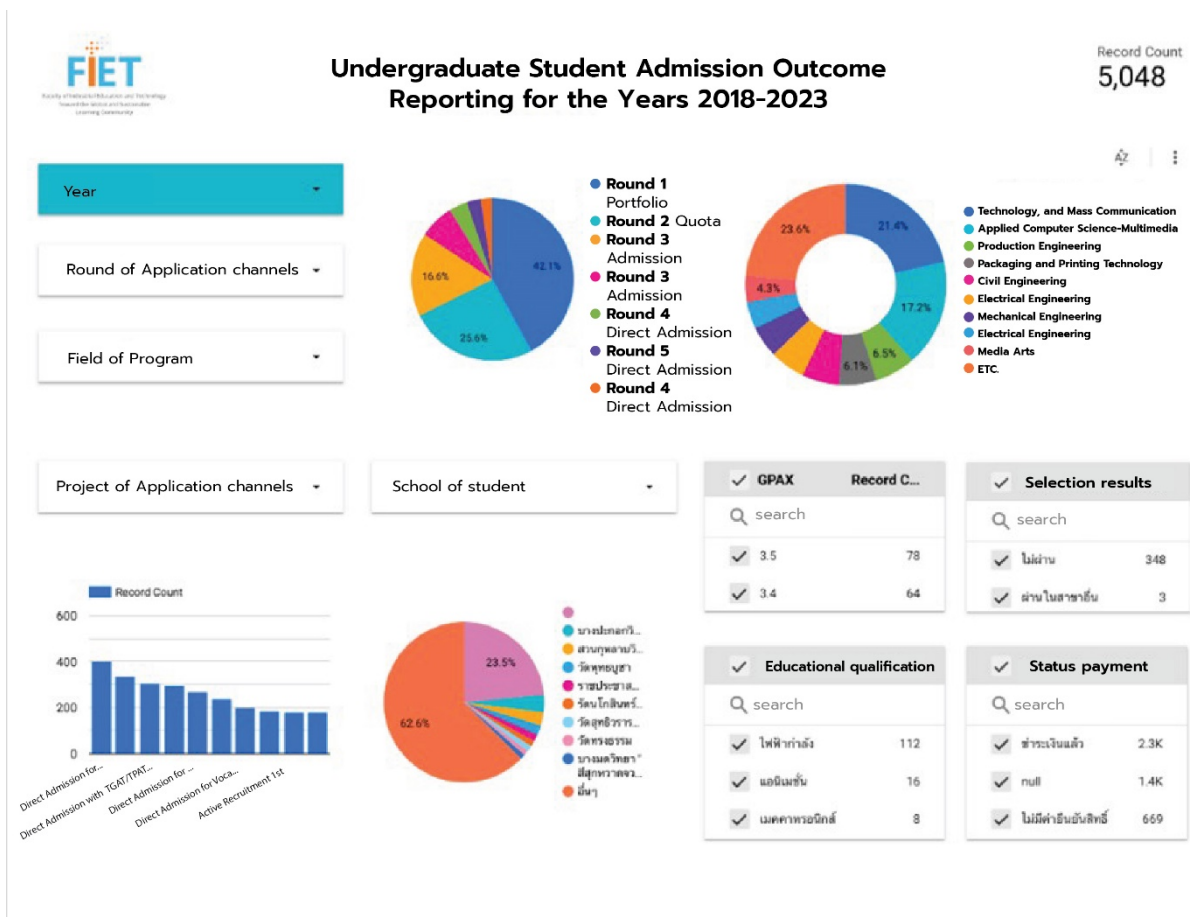Figure 2: Undergraduate Student Admission Outcome Reporting (New Format)

Figure 3: Undergraduate Student Admission Outcome Reporting for the Years 2018-2023 (New Format)

Based on the satisfaction survey study regarding the student admission reporting within the Faculty of Education (Information Report), the findings are as follows:

1. Evaluate System Quality by Experts

Evaluate the system's quality by engaging experts who can employ various methods such as system testing, code reviews, and peer assessments to identify areas for improvement and refinement.

Title for evaluation	$\bar{x}$	S.D.	Level of Satisfaction
1. Suitable Data	4.67	0.58	The Highest
2. User-Friendly	4.00	1.00	High
3. Appropriate Reporting of Results	4.67	0.58	The Highest
Overall Average Evaluation Result	**4.44**	**0.72**	**High**

Table 3: The Result Evaluate System Quality by Experts (N=3)

Table 3 showed the result of Evaluate system by Experts ,focuses on assessing various aspects, including Suitable Data, User-Friendliness, and the Appropriate Reporting of Results. The experts provided ratings on a scale of 1 to 5, and the results were analyzed to derive an overall assessment.

Suitable Data : The system received an impressive average rating ($\bar{x}$) of 4.67 with a standard deviation (S.D.) of 0.58. This indicates a high level of agreement among experts regarding the system's capability to handle suitable data. The consensus was that the system excelled in this aspect, earning it the designation of "The Highest" level of satisfaction.

User-Friendly: With an average rating of 4.00 and a standard deviation of 1.00, the system demonstrated a high level of user-friendliness. While there was a slightly greater variability in expert opinions compared to other criteria, the overall assessment remained at a "High" level of satisfaction.

Appropriate Reporting of Results: Similar to the Suitable Data criterion, the system received an impressive average rating of 4.67 with a standard deviation of 0.58. The unanimous agreement among experts on the excellence of the system's reporting capabilities warranted the designation of "The Highest" level of satisfaction Overall Average Evaluation Result : Combining the evaluations across all criteria, the system achieved an impressive overall average rating ($\bar{x}$) of 4.44, with a standard deviation of 0.72. This reflects a high level of consistency in expert opinions, resulting in an overall assessment at the "High" level of satisfaction.

The findings of this evaluation underscore the exceptional quality of the data for beneficial purposes, particularly in terms of accuracy, completeness, and usability. The consistently high ratings across all dimensions highlight the reliability and effectiveness of the data, providing valuable insights for stakeholders and decision-makers.

2. Assess User Satisfaction With the System

Evaluate user satisfaction by the sample group consists of individuals directly involved in the Executives of Faculty Industrial Education and Technology. And who responsible for admissions, and staff members assigned to carry out tasks.

Title for evaluation	$\bar{x}$	S.D.	Level of Satisfaction
1. Suitable Data			
1. Data Accuracy	4.68	0.57	The Highest
2. Data Completeness	4.32	0.72	High
3. Usability of Data for Beneficial Purposes	4.73	0.63	The Highest
Overall Average Evaluation Result	**4.58**	**0.64**	**The Highest**

Table 4: The Result Assess User Satisfaction with the System of Suitable Data (N=22)

Table 4 showed the result of Assess User Satisfaction with the System of Suitable Data, this research delves into a comprehensive evaluation of data quality with a specific focus on its suitability for beneficial purposes. The assessment encompasses three critical dimensions: Data Accuracy, Data Completeness, and Usability of Data. Ratings, represented by $\bar{x}$ (average), S.D. (standard deviation), and the Level of Satisfaction, were assigned on a scale from 1 to 5. The study culminates in an overall assessment that provides valuable insights into the quality and usability of the data for various purposes.

Data Accuracy: The research reveals an outstanding average rating ($\bar{x}$) of 4.68 for Data. Accuracy, coupled with a low standard deviation (S.D.) of 0.57. This indicates a remarkable consensus among evaluators, signifying that the data is exceptionally accurate, resulting in a "The Highest" level of satisfaction.

Data Completeness: In terms of Data Completeness, the data achieved a commendable average rating of 4.32, with a standard deviation of 0.72. While slightly lower than other criteria, the overall assessment still categorizes the data as "High" in terms of satisfaction.

Usability of Data for Beneficial Purposes: The research highlights the superior usability of the data, with an impressive average rating of 4.73 and a standard deviation of 0.63. Evaluator consensus designates this aspect as achieving "The Highest" level of satisfaction, emphasizing its effectiveness for various beneficial purposes.

Overall Average Evaluation Result: Combining evaluations across all criteria, the data obtained an impressive overall average rating ($\bar{x}$) of 4.58, with a standard deviation of 0.64. This indicates a high level of consistency in evaluator opinions, resulting in an overall assessment at "The Highest" level of satisfaction.

This research provided a comprehensive understanding of the quality and usability of data for beneficial purposes. The consistently high ratings in accuracy, completeness, and usability underscore the reliability and effectiveness of the data, offering valuable insights for stakeholders seeking to leverage data for informed decision-making and strategic planning.

Title for evaluation	$\bar{x}$	S.D.	Level of Satisfaction
2. Report System			
1. User Friendly	4.41	0.67	High
2. Appropriate Reporting of Results	4.50	0.67	The Highest
Overall Average Evaluation Result	**4.45**	**0.67**	**High**

Table 5: The Result Assess User Satisfaction with the System of Report System (N=22)

Table 5 show the result of Assess User Satisfaction with the System of Report System, this research investigates user satisfaction with a Report System through a meticulous evaluation involving a sample group of 22 participants. The study focuses on two critical dimensions: User-Friendliness and the Appropriate Reporting of Results. Ratings, represented by $\bar{x}$ (average), S.D. (standard deviation), and the Level of Satisfaction, were assigned on a scale from 1 to 5. The findings provide insights into the perceived usability and effectiveness of the system.

User-Friendly: The participants' average rating ($\bar{x}$) for User-Friendliness was 4.41, with a standard deviation (S.D.) of 0.67. This indicates a high level of satisfaction, categorizing the system as "High" in terms of user-friendliness.

Appropriate Reporting of Results: For the Appropriate Reporting of Results, the average rating was 4.50, with a standard deviation of 0.67. Evaluator consensus designates this aspect as achieving "The Highest" level of satisfaction, emphasizing the system's excellence in reporting results.

Overall Average Evaluation Result: Combining evaluations across both criteria, the system obtained an overall average rating ($\bar{x}$) of 4.45, with a standard deviation of 0.67. This indicates a consistent level of satisfaction among users, resulting in an overall assessment at the "High" level.

This research provides a comprehensive understanding of user satisfaction with the Report System, emphasizing its high level of user-friendliness and excellence in reporting results. The consistently positive ratings from the sample group underscore the system's effectiveness and usability, offering valuable insights for system developers and stakeholders. These findings contribute to informed decision-making for further system enhancements and improvements.

Conclusion

In summary, the study examined the possible advantages and consequences of putting the suggested information system into practice within the framework of the Faculty of Industrial Education and Technology (FIET). According to the results, the implementation of this information system has the potential to displace conventional report formats and bring about a more simplified and effective method of data administration.

The technology was ready to give FIET executives the power to strategically create courses that exactly match the changing demands of students. Decision-makers can obtain important insights into the curriculum design process by utilizing the information system's capabilities, which promotes flexibility and responsiveness to new developments in education.

Additionally, the information system proved to be very helpful for data-driven planning related to student applications for bachelor's degree programmed in the upcoming academic year. Its capacity to harness and analyze data provides a strategic advantage in tailoring application channels to align with the evolving preferences and requirements of prospective students.

The information system's incorporation of cloud computing technologies guarantees simple accessibility, improving stakeholders' overall user experience. This feature makes it easier to

obtain important information, which boosts productivity and creates an atmosphere that is easy to utilize.

In conclusion, the suggested information system offers a complete solution that, in addition to taking the place of conventional reporting techniques, empowers decision-makers, makes strategic curriculum creation easier, helps with student application preparation, and guarantees accessibility via cloud computing. The present study established the foundation for the implementation of the information system in FIET by providing a proactive method for managing data and making strategic choices in the academic setting.

Suggestions

It became clear from the creation of Informative Reports for the Analysis of Student Admission that the information provided by the present data reporting was insufficient to analyze students' growth during the course. As a result, data collecting will be improved in the future, beginning before students are admitted and continuing until their studies are finished. The goal of this thorough data gathering is to make analysis easier to plan and create future course enhancements.

Reference

[1] Srimontrisanga, W. (n.d.) *Development of Admission System for University Education.* Journal Council of University Administrative Staff of Thailand (CUAST), Vol. 11, No. 3, pp. 118-128.

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