DEVELOPMENT AND EVALUATION OF DIGITALLY MANAGING UNIVERSITY EXTRACURRICULAR ACTIVITIES

Nguyen Xuan Ha Giang* **and Lam Thanh Toan**

Faculty of Information Technology, Cantho University of Technology, Vietnam

**Corresponding author: Nguyen Xuan Ha Giang, Email: nxhgiang@ctuet.edu.vn*

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Abstract

Assessment and Grading website has been developed using a web-based platform, designed to facilitate the evaluation of extracurricular activities related to students' academic performance at Cantho University of Technology. This approach has allowed the university to streamline its grading process with a centralized online application, encompassing all essential contingencies, including the consolidation, storage, and retrieval of transcripts from previous academic years, along with supporting evidence of student activities. This has resulted in increased transparency and flexibility in terms of time and location for processing. Users have highly praised the website's contribution and its supporting role, with satisfaction levels exceeding 90% across various criteria: (1) they highly satisfied with the website's utility and convenience. (2) The website has improved grading and review processes, reduced printing costs, facilitated document retrieval, allowed for the comparison of student activity evidence, optimized storage space, and streamlined procedures. (3) It has played a crucial role in enhancing accuracy and transparency in student grading, significantly contributing to the digital transformation efforts, making the management of student extracurricular activities at the university more essential and efficient.

Keywords: *Cantho University of Technology, digital transformation application, student, training assessment.*

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XÂY DỰNG VÀ ĐÁNH GIÁ ỨNG DỤNG CHUYỂN ĐỔI SỐ TRONG CÔNG TÁC QUẢN LÝ HOẠT ĐỘNG NGOẠI KHÓA CỦA SINH VIÊN ĐẠI HỌC

Nguyễn Xuân Hà Giang* **và Lâm Thanh Toản**

Khoa Công nghệ Thông tin, Trường Đại học Kỹ thuật - Công nghệ Cần Thơ, Việt Nam

**Tác giả liên hệ: Nguyễn Xuân Hà Giang, Email: nxhgiang@ctuet.edu.vn*

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Tóm tắt

Website Đánh giá chấm điểm rèn luyện được phát triển trên nền tảng web, hỗ trợ môi trường đánh giá, định lượng hoạt động ngoại khóa và mối tương quan với kết quả học tập của sinh viên Trường Đại học Kỹ thuật - Công nghệ Cần Thơ. Việc triển khai sử dụng website giúp nhà trường tối ưu hóa quy trình chấm điểm, thay thế phương pháp thủ công truyền thống bằng ứng dụng trực tuyến với nghiệp vụ tập trung. Ứng dụng cung cấp đầy đủ tính năng của quy trình chấm điểm rèn luyện tại Trường, đối chiếu minh chứng hoạt động của sinh viên, lưu trữ, tìm kiếm bản điểm các năm học trước, gia tăng tính minh bạch, linh hoạt thời gian, địa điểm xử lý. Khả năng đóng góp của website được người dùng đánh giá cao qua tiêu chí. (1) Mức độ hài lòng về tính dễ thao tác, dễ sử dụng, bố trí hợp lý chiếm 93%. (2) Lợi ích nhận được từ sử dụng phần mềm về tính hiệu quả, ổn định, mục tiêu, biểu mẫu, quy trình và khả năng hỗ trợ giải quyết thắc mắc từ sinh viên đạt 90%. (3) Mức độ hài lòng của người dùng là 94%. Ứng dụng hiện thực được nghiệp vụ đánh giá ngoại khóa trong sinh viên vào môi trường trực tuyến đa người dùng, nâng cao độ chính xác và minh bạch trong việc chấm điểm ngoại khóa, tiết kiệm chi phí in ấn, tìm kiếm, lưu trữ. Website cũng đã góp phần vào hoạt động chuyển đổi số trong công tác quản lý sinh viên của nhà trường tạo nên sự cần thiết và hiệu quả hơn.

Từ khóa: *Điểm rèn luyện, sinh viên, trường Đại học Kỹ thuật - Công nghệ Cần Thơ, ứng dụng chuyển đổi số.*

1. Introduction

The enforcement of Circular No. 16/2015/TT-BGDDT, issued by the Ministry of Education and Training on August 12, 2015, which deals with guidelines for assessing undergraduate students' extracurricular grades, requires that universities regularly conduct evaluations and maintain records of students' conduct grades for every semester, academic year, and the entire duration of their academic program (Ministry of Education and Training, 2015). As per the circular's provisions, universities are tasked with archiving and overseeing records of students' conduct grades for each semester and academic year. These records are subsequently utilized for various purposes, including scholarship assessment, commendations, disciplinary measures, academic probation, discontinuation of studies, and other priority considerations in accordance with the Ministry of Education and Training's directives. According to Bakoban (2015), survey results indicate that each educational institution establishes its own criteria for selecting extracurricular activities, such as skill training courses, workshops, festivals, competitions, journeys and visits, based on students' gender, culture, and their positive responsiveness. Consequently, it becomes challenging to ascertain which type of extracurricular activity is suitable for a particular educational establishment. Tanner (2017) and King (2021) further illustrate that specific forms of extracurricular activities, such as clubs and entertainment, can potentially have a positive impact on academic performance, contribute to a balanced life, enhance self-confidence, foster a sense of responsibility, and contribute to the school as well as one's own positive values. In Vietnamese universities, assessing students' conduct grades is structured around five rating levels, each corresponding to five distinct sets of evaluation criteria as delineated in this circular.

Currently, most universities rely on manual methods to assess and store students' conduct grades, which come with several challenges: (i) Students often exceed the maximum score for each criterion, leading to inaccurate grade reporting. (ii) Faculty and student committees invest significant time, effort, and resources in verifying and managing conduct grade records through traditional documentation. (iii) The Covid-19 pandemic disrupts the process, requiring an online environment and specialized teams to handle increased workloads, resulting in delays.

In response to these challenges, the author proposes the development of an application specifically designed to support the student grade assessment. This proposed application aims to tackle the following issues: offering a convenient working environment for students, student councils, faculty advisors, and academic mentors, reducing the time and expenses incurred by students, improving accuracy and timeliness, ensuring data readiness, enhancing productivity and efficiency. Subsequent sections will present pertinent research in section 2, outline the research content in section 3, describe the research findings in section 4, and finally, present conclusions and directions for future development in the concluding section.

2. Related works

2.1. Extracurricular student performance scores

Student extracurricular performance serves as a crucial component in the process of evaluating and providing comprehensive feedback on their overall development, a practice effectively implemented by many higher education institutions both nationally and internationally. Yildiz et al. (2019) has demonstrated that engagement in extracurricular activities contributes to long-term educational success, resulting in positive changes through the interaction between extracurricular involvement, communication skills, and educational outcomes. Mahoney et al. (2003) and Fakhretdinova et al. (2021) explore the potential of extracurricular activities as a vital tool for developing soft skills and assessing their significance for engineering students at the university level. To investigate whether extracurricular activities support academic success, Kelepolo (2011) provides evidence through a strong correlation found between academic performance and the reference assessment method of the specified criteria. In Vietnam, many universities encourage students to enhance their competencies and qualities during their education by linking students with community service activities (Nguyen et al., 2023). The outcomes of this process are recorded in the extracurricular program cumulative grade, which serves as the basis for scholarship evaluation and scholarship level advancement among students.

To tackle difficulties associated with evaluating, reporting, and managing conduct grades, as well as overseeing extracurricular activities, certain institutions have undergone digital transformations in their handling of students' conduct grades. Ngo (2019) has outlined the existing challenges in the assessment of training scores in our country at present and proposed solutions within the management practices of educational institutions. The University of Finance – Marketing (Student Affairs Office, University of Finance and Marketing, 2023) has adopted an online platform for conducting conduct grade assessments, making it easier for students to report their activity involvement, not restricting it to the school's purview. However, the collection of supporting evidence still relies on traditional manual methods, with students required to submit such evidence to the Student Affairs Officer. Additionally, Ho Chi Minh City University of Technology (Student Affairs Office, Ho Chi Minh City University of Technology, 2017) has also embraced digital innovations in the management of conduct grades. HUTECH has implemented an online assessment system, allowing students to declare and document their participation in activities while including visual evidence to substantiate their claims. When students declare their activities and provide evidence, class leaders conduct individual assessments based entirely on their personal judgement.

This article proposes the development of a comprehensive support system for the assessment of conduct grades for regular undergraduate students. Additionally, the effectiveness of the application will be evaluated when implemented in practice at Cantho University of Technology.

2.2. Research methodology

This study was oriented towards application development and community-based application evaluation (Lam et al., 2023; Dinh et al., 2018).

2.2.1. Software Process Models

This study undertook the development of a software application using the waterfall development model. The Waterfall model, proposed by Winston W. Royce in 1970 to describe a possible software engineering practice, encompasses the following phases: requirement analysis, system design, program design, coding, unit and integration testing, system testing, acceptance testing, and operation and maintenance.

2.2.2 Survey questionnaire design

The survey questions are geared towards shedding light on two critical aspects in this research: the ease of use and the advantages provided by the software. The target audience for this questionnaire is university students, with the aim of understanding their unique perspectives and experiences with the software. The question content is crafted based on a previous study (Lam et al., 2023) and expanded upon to provide detailed insights into the research issue, ensuring a comprehensive and high-quality data collection process. The survey employs Likert scale questions with 5 levels, facilitating the capture of both shared opinions and nuanced views from students regarding the software's usability and benefits.

3. Material

3.1. Application development technology

In this research, PHP and MySQL were selected as the programming language and database, respectively, to build the application. According to Sotnik (2023), PHP and MySQL are well-suited for web-based projects due to their cost-effectiveness, scalability, user-friendliness, and compatibility. Furthermore, to enhance the application's data transmission efficiency, the authors employed AJAX - Asynchronous JavaScript and XML, a technique elucidated by Paulson (2005). AJAX proves to be a highly effective approach for developing interactive web applications that are both faster and more responsive. It enables websites to update content asynchronously by exchanging small data packets with the server, eliminating the need for reloading the entire page. In traditional client-server interactions, users are redirected to a new page displaying fresh information retrieved from the server when they complete a form and click the Submit button. AJAX has found widespread use in applications supporting the development of learning environments, educational assessment systems, and multi-user interactions (Williams et al., 2004; Su et al., 2021). Upon clicking Submit, JavaScript sends a request to the server, updating the current screen without requiring a full page reload.

3.2. Process of extracurricular grade assessment

In the context of the management of extracurricular activity records (EAR) at Cantho University of Technology, this website serves as a centralized platform. Users are required to log in with pre-issued accounts in order to access the system. The EARs are displayed following the university's specified format. Figure 1 illustrates the process flow beginning with (1) System Administrators initializing and updating user information and permissions. (2) The faculty executive committee defines the information and announces the assessment timeline, concurrently opening the system for students to self-assess their EARs, with one EAR generated for each student. Additionally, the system will automatically assign default activity scores to students based on the defined participation lists within the corresponding time frame. Students without any extracurricular activities will not have their participation recorded, resulting in a default EAR score of 0. (3) Students (ST) self-declare their personal EARs within the allowed timeframe, view their anticipated scores once approved by their academic advisors. (4) Academic advisors assess the stage 1 scores, address student inquiries, or forward them to the faculty executive committee for stage 2 assessment and the creation of official scores for students.

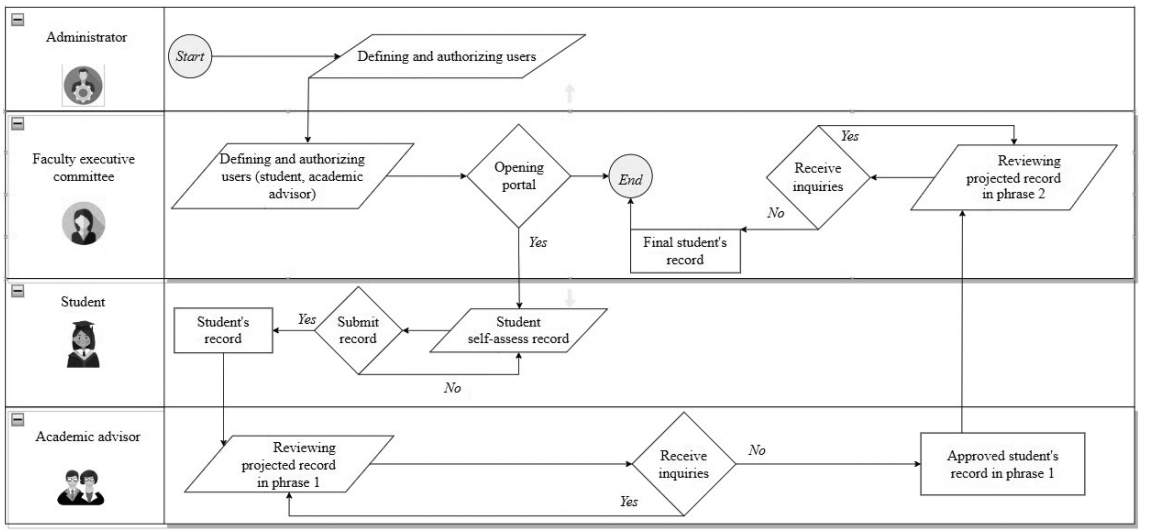


Fig. 1. An overview of the university's extracurricular student evaluation process

4. Model and experiment

4.1. User-centric business model and experimental result

4.1.1. Administrative model for information portfolio, authorization, and extracurricular score review management

Table 1. Catalog of functions for administrators, faculty executive committees

Function	User groups	Description	Process results
Information category management	Administrator	Update faculty, school year information	Users information lists
	Faculty executive committee	Update information: department, classes, students, academic advisors	
		Specify extracurricular pursuits and the standard grading threshold	
Authorization management	Administrator	Create faculty user accounts, and assignment	Permissions information lists
	Faculty executive committee	Create user accounts: students, academic advisors, and assignment	
Extracurricular score review management	Administrator	Open/ Close the scoring portal	Final extracurricular score reports
	Faculty executive committee	Open/ Close the scoring portal	
		Review, address inquiries, announce final extracurricular scores, and reports	

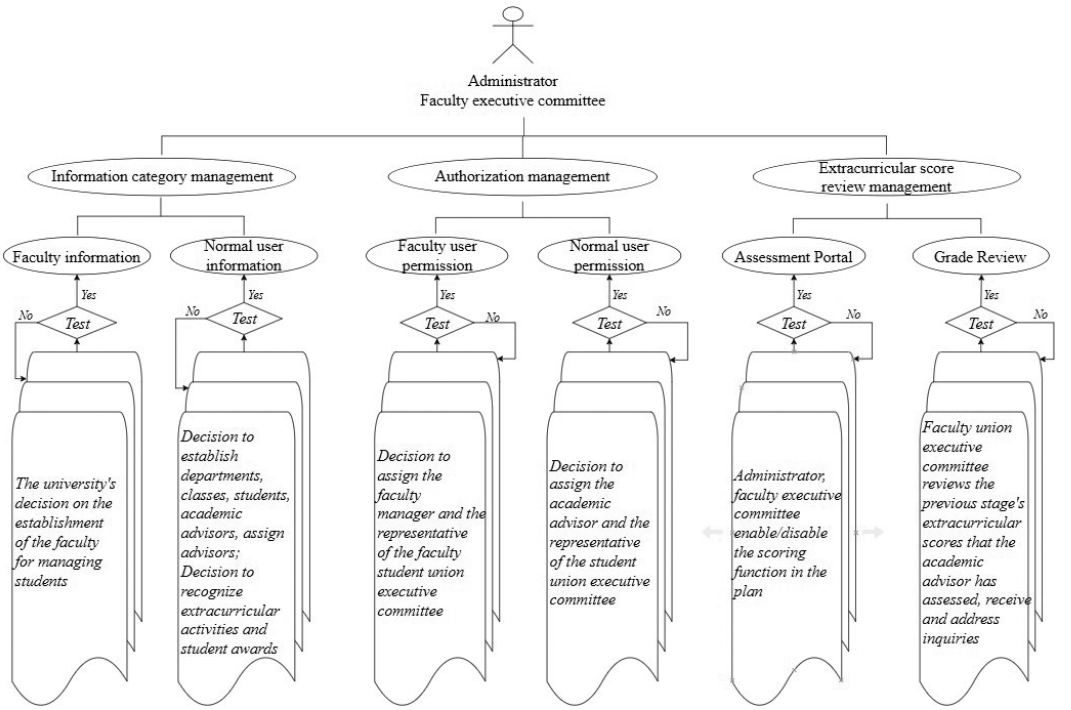


Fig. 2. Business model for administrators and faculty executive committee

In essence, system administrators are tasked with the supervision of categories and users. Their responsibilities encompass the input of department-specific data across multiple tiers, the establishment and allocation of user permissions within the department, as well as the management of department-level administrative functions (Table 1). The faculty union executive committee is responsible for overseeing the faculty portfolio and providing the ultimate approval for the student evaluation process. Furthermore, this committee is involved in the creation and maintenance of class, student records, the academic advisors, user assignment, and the establishment of operational parameters at the department level or above, scoring gateways, handling inquiries, and approving the final scores for the entire faculty. Figure 2 illustrates the operational framework that was put into practice during the experiment in order to generate the application interface presented in Figure 3.

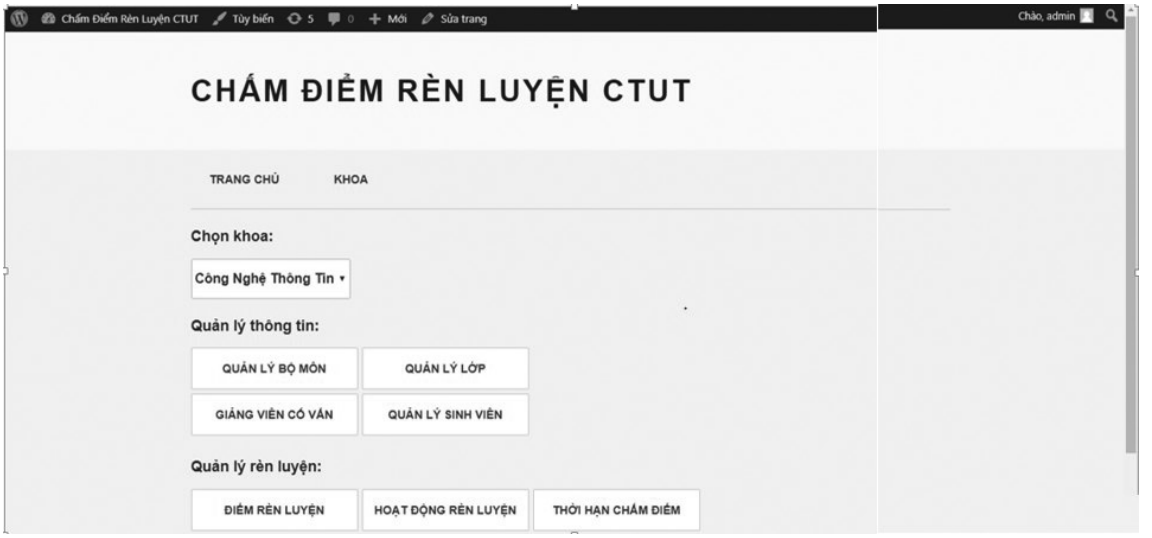


Fig. 3. The homepage for administrators and faculty executive committee

4.1.2. Academic advisor model for extracurricular score review in phase 1

Table 2. Catalog of functions for academic advisor, branch executive committees

Function	User groups	Description	Process results
Information portfolio management	Academic advisor	Update student, class information	Users information lists
Authorization management	Academic advisor	Create student user accounts, and assign permissions	Permissions information lists
Extracurricular score review management	Academic advisor	Open/ Close the scoring portal for student, class Review, address inquiries, expected announce extracurricular scores	Expected extracurricular scores report
	Branch executive committee	Specify extracurricular pursuits and the standard grading threshold Review, address inquiries, announce expected extracurricular scores	

Academic advisor is in charge of overseeing class categories, outlining class activities, and distributing user permissions. The advisor holds the initial responsibility for validating student qualifications and addressing inquiries. Every semester, the class union executive committee delineates the nature of activities and grading standards, manages, supervises, records the advancement and outcomes of student activities, and updates the system. This process forms the fundamental framework for student engagement in activities, as illustrated in Figure 4.

The self-assessment scores, once submitted by students, will be placed in the queue for review by the academic advisor in phase 1, followed by approval by the faculty executive committee in phase 2. Each phase includes a designated period for receiving and addressing student inquiries before the official announcement of the extracurricular activities scoring sheet (Fig. 5).

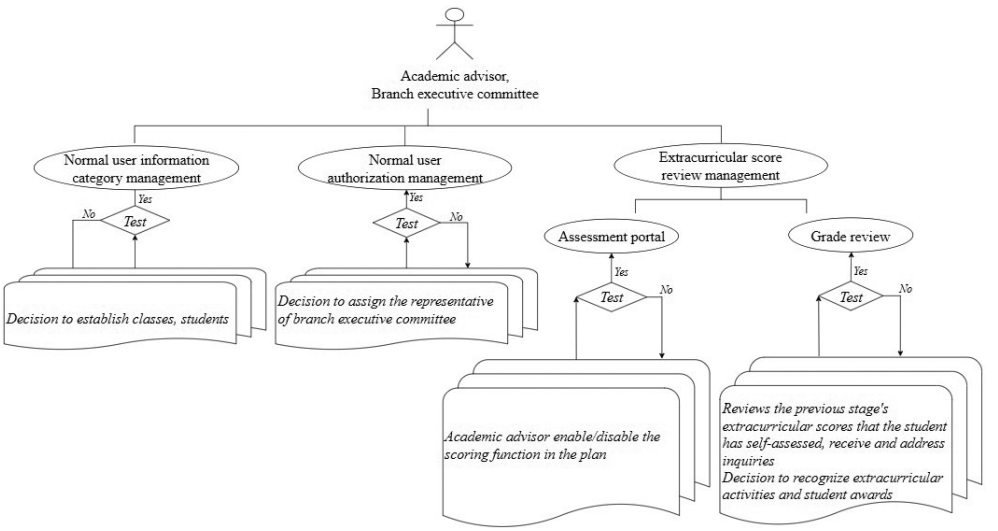
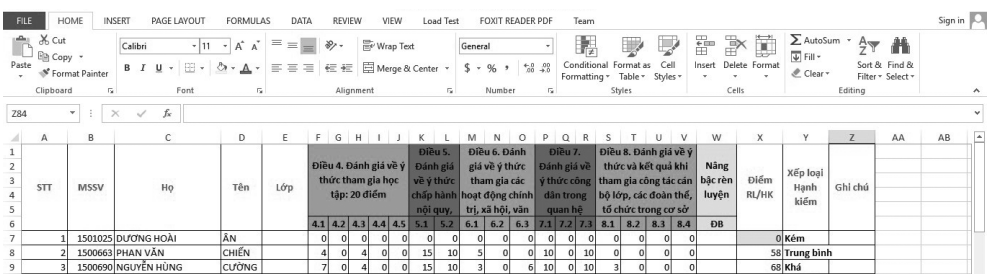


Fig. 4. Academic advisor, branch executive committee score review business model



STT	MSSV	Họ	Tên	Lớp	Điều 4. Đánh giá về ý thức tham gia học tập: 20 điểm					Điều 5. Đánh giá về ý thức chấp hành nội quy,		Điều 6. Đánh giá về ý thức tham gia các hoạt động chính trị, xã hội, văn			Điều 7. Đánh giá về ý thức công dân trong quan hệ			Điều 8. Đánh giá về ý thức và kết quả khi tham gia công tác cán bộ lớp, các đoàn thể, tổ chức trong cơ sở				Năng bậc rèn luyện	Điểm RL/HK	Xếp loại Hạnh kiểm	Ghi chú
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2	1500663	PHAN VĂN	CHIẾN		4	0	4	0	0	15	10	5	0	0	10	0	10	0	0	0	0		58	Trung bình		
3	1500690	NGUYỄN HÙNG	CƯỜNG		7	0	4	0	0	15	10	3	0	6	10	0	10	3	0	0	0		68	Khá		

Fig. 5. Academic advisor, executive committee exports grade reports

4.1.3. Student model for self-assessment of extracurricular scores

The primary goal of the application is to offer maximum convenience, eliminating the need for students to remember their extracurricular activity history. Table 3 provides an overview of essential functions available to students, which are elaborated upon in the business process diagram depicted in Figure 6.

Student extracurricular activities throughout the semester, depending on the specific level, will be recorded in the system by the branch or the faculty executive committee, along with the definition of corresponding achievement score criteria. When the recording function is enabled, students log in and self-assess their extracurricular activity scores (Fig. 7). The recorded scores are automatically integrated into the respective section of each student's record.

Table 3. Catalog of functions for student

Function	User groups	Description	Process results
Self-assessment	Student	Empowers students to self-evaluate and submit scores using provided templates, attaching up to 5 supporting image files: diplomas, certificates, accolades, certifications; Review projected scores evaluated by academic advisors; Update the evaluation sheet during the inquiry period	
Searching and reporting results	Student	Retrieve and review activity assessment outcomes organized by semester and academic year	Final extracurricular score reports

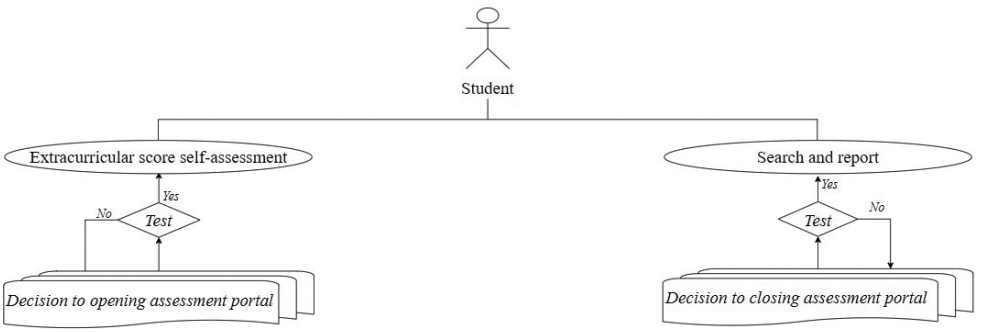

Fig. 6. Bussiness model of student

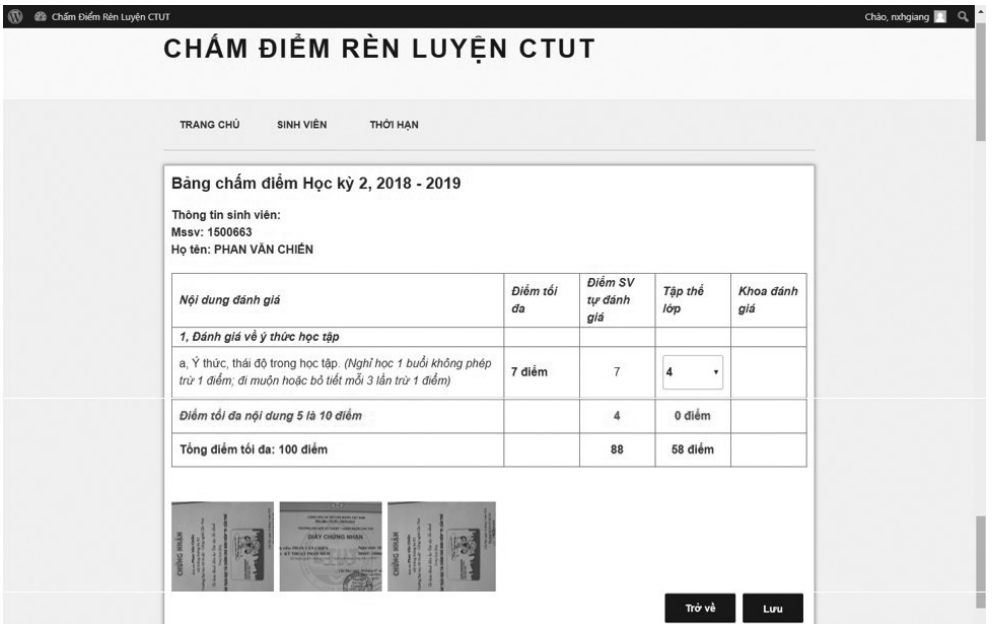

Fig. 7. Student self-assesses extracurricular score record, sends activity evidence

Students can examine their comprehensive extracurricular score for each semester or an overview of their engagement in diverse activities across multiple semesters (Fig. 8). Students are solely permitted to access and export their individual extracurricular record information, while the creation of class-level academic record lists for academic advisors, the faculty or branch executive committee is managed separately.

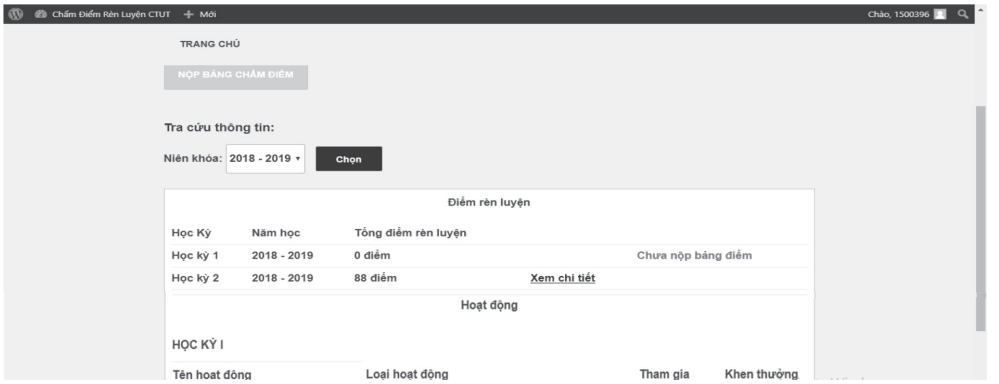

Fig. 8. Students accessing the formal extracurricular evaluation scores

4.2. Evaluation method

For effectiveness evaluation, a Likert scale with five levels was used to gauge intentions, attitudes, and factors influencing behavior. These were conceptualized as perceptual aspects and assessed through indices. This method is widely employed in various studies for measuring attitudes as demonstrated by previous studies (Thang, 2022; Thi, 2023; Alabi, 2023). The website, designed for assessing regular student scores at Cantho University of Technology, was put into operation to assess its practical problem-solving capabilities and its effectiveness in supporting student management. The survey was conducted using Google Forms, where respondents rated each criterion on a scale of 1 to 5: 1) Strongly Disagree; 2) Disagree; 3) Neutral; 4) Agree; 5) Strongly Agree. Specifically, survey participants were grouped into categories: (1) Ease of Operation – User-Friendliness, (2) Benefits Obtained from Software Use, (3) User Satisfaction Level. Each aspect was assessed on a 5-point scale based on user feedback. The author processed the survey results using Microsoft Excel 2016 software, and the summarized opinions are presented in the table below.

4.3. Survey results

The survey findings, based on responses from 71 students spanning three departments (Information Technology, Electrical - Electronics - Telecommunications, and Mechanical Engineering), revealed that more than 92% of participants deemed the application user-friendly, suitable functionality and advantageous in overseeing the regular assessment scores at Cantho University of Technology. Most users conveyed their contentment with the application.

In Table 4, the majority of students noted the harmony of the color interface (92%) and the logical arrangement of functional elements (93%). Due to their familiarity with information technology in the academic environment, particularly among students in the engineering and technology fields, the ability to use the website's utilities immediately, without the need to consult instructional videos, is also quite high (94%).

Table 4. Statistical analysis of the survey results on "Ease of operation, usability"

Survey criteria	Response rate (%)				
	1	**2**	**3**	**4**	**5**
Harmonizing the color palette of the user interface of the Extracurricular evaluation website	0	8	21	57	14
The functions of the website are logically and clearly arranged	0	7	11	67	15
Utilizing the available utilities immediately upon logging into the web-site without requiring the viewing of instructional videos	0	6	14	63	17
Survey Average	**0**	**7**	**16**	**62**	**15**

Table 5. The benefits derived from software utilization

Survey criteria	Response rate (%)				
	1	2	3	4	5
The overall effectiveness level of the website that has been utilized	0	7	10	59	24
The website meets the requirements and objectives for the extracurricular evaluation of students	0	7	11	54	28
After using this website, users can save time, storage costs, transportation expenses, printing costs, and increase productivity in the process	0	3	13	57	27
The website has consistently and reliably functioned during its usage	0	10	13	57	20
The website adheres accurately to the student activity evaluation forms, regulations, and procedures	0	3	15	59	23
The website provides an effective environment for students to inquire about activity evaluation scores, address inquiries conveniently and appropriately	0	10	14	55	21
Survey Average	**0**	**7**	**13**	**57**	**23**

Table 6. User satisfaction level

Survey criteria	Response rate (%)				
	1	2	3	4	5
User satisfaction level regarding extracurricular activity evaluation website for student	0	6	13	63	18
Users are willing to recommend this software to others	0	6	21	50	23
Survey Average	**0**	**6**	**17**	**57**	**20**

In terms of overall effectiveness, the responsiveness to grading requirements by users who have been using the assessment website is at 98% among the surveyed students. The 97% rate regarding the potential for time and cost savings for students, academic advisor, as well as adherence to the form-filling procedures, demonstrates the practicality of integrating the website into the educational setting. The website supports a multi-user environment and is currently in the process of refining its features; therefore, the level of stability (90%), reliability, and user support in interactive environments for student inquiries about their grades still require ongoing development.

The study also assessed user satisfaction and the inclination to recommend the website to users across different management departments (Table 6). the findings indicate that 94% of the surveyed participants acknowledged the website's proficiency in handling grading tasks and expressed their intention to promote it to others.

In general, the overall assessment of the three evaluation aspects (1) Ease of operation, usability, (2) Benefits derived from software utilization, and (3) User satisfaction is depicted in Figure 9. The first ratio highlighted in the survey results is that 93% of opinions expressed satisfaction with the ease of use, particularly the color design, harmony, and attractiveness. It is interesting that the survey exclusively targeted students in the fields of electrical engineering, electronics, telecommunications, and information technology. Engaging with a web-based application poses minimal challenges for this user demographic. This is evident that, despite their initial exposure to the new environment, users prioritize video tutorials on usage the least in their evaluations.

The figure of 93% also represents the positive factors contributing to the Website's responsiveness to user needs. A majority of the outcomes demonstrates contributory benefits in reducing costs, time, enhanced communication channels. However, to heighten user persuasion, it is imperative to expand the deployment of the Website across a spectrum of students in different disciplines, employing a targeted strategy for independent user groups. Concurrently, it is necessary to stimulate a reevaluation of the functionality and existing benefits, aiming to augment and increase the utility of the Website over time.

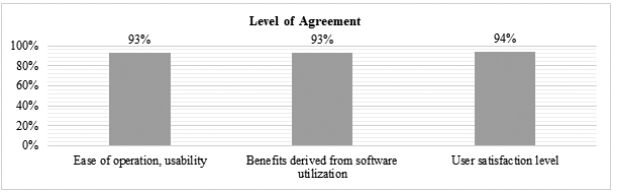

Fig. 9. Aggregation of agreement ratios across the three survey criteria

The final aggregated data obtained for the User Satisfaction Level assessment reached 94%, representing the highest proportion in the survey. This interesting figure indicates the software's potential to quickly gain acceptance among various user groups in different departments. This creates conditions for the author to expeditiously extend the reach of the website, making it increasingly diverse in functionality and utility.

5. Conclusion

Engagement in extracurricular activities brings about numerous positive impacts on students' behavior, attitudes, and community involvement. The university acknowledges, evaluates the importance process of student in contemporary education. Therefore, the author has employed a website for assessing extracurricular activities. The advantages include performance improvement, cost reduction, providing convenient, private, and multi-user groups. The website is recognized as an efficient environment for facilitating the evaluation of regular university students.

The study's content and research methodologies were meticulously designed to ensure scientific rigor and strict adherence to the research focus. Findings from user surveys have validated the advantages offered by the website, including its user-friendly interface, the functionality it provides, and user satisfaction with the platform.

In the future, to optimize the process, the website aims to integrate recommendation techniques based on content (Content-based Recommender) or rating (User-based Recommender) when assessing students' points. This approach is intended to reduce score disparities between students and academic advisors. (1) Recommending suitable scores to a student's participation in extracurricular activities is minimal or average, when they have not violated any rules. There is no need for the student to self-report a high score or the opposite. (2) Supporting evidence suggestions, derived from the aggregated data, discerning the various roles of student in their activities. This aids advisors in choosing an appropriate score. (3) Establishing a connection between the academic grading system and the extracurricular scoring system to motivate students to study diligently.

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