



Exploring Users' Perspectives on Co-Curricular Registration System using TAM Model

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ABSTRACT

The purpose of conducting co-curricular activities in Malaysia's educational system is to help the students to achieve a balance life style between spiritual, mental and physical well-being. The Centre of Foundation Studies, Universiti Teknologi MARA has developed a Co-curricular Registration System (CRS) to record all activities participated by the students. In addition, this online system can show the available activities for the students which make it easier for them to get updated information on any current and forthcoming activities. The good thing about this system is that the administrative officer can monitor the student's achievement and performance directly through the CRS system. Besides that, CRS can make the student easily register co-curricular activities without facing the long queue and it helps the environment by reducing paper consumption. This research was conducted by using a set of questionnaire distributed to the students as the users in order to get the response of usefulness. Technology Acceptance Model (TAM) was used to show the perceived ease of use and perceived usefulness which act as internal variables that influence attitude and intention to use. This study found that the correlation coefficient value was higher, and there was a strong positive correlation between perceived ease of use and positive attitude towards CRS. The overall results showed perceived usefulness on user's attitude, system quality, and perceived usefulness had positive effects on user's intention to use the system as well as towards QR code in CRS.

Keywords:

Online registration system; QR code;
users' perspectives; TAM model

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1. Introduction

Co-curricular activities have long been practiced in Malaysia's educational system to produce excellent spiritually and mentally type of students. The co-curricular activities do not just focus on sports activities but also in arts and design, humanities, sociology, innovation, religion and others. For a student to apply for a place at any public university in Malaysia through the University Intake Unit or Unit Pengambilan University (UPU) system, it is a requirement for student to score a maximum of 10% in co-curricular activities. Therefore, the Co-curricular Registration System (CRS) was developed for Centre of Foundation Studies, Universiti Teknologi MARA as a platform for students to register co-curricular activities organized by student club, academic affairs, student affairs, lecturers, campus and resident colleges. In addition, the CRS has also been used by the students to monitor their achievement in co-curricular right after they attended any activity.

Since 2011 until 2013, the co-curricular registration at the academic centre has been conducted using paper-based method which caused problems for thousands of students to queue up and try to

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get a place into a co-curricular club. Therefore, in 2014, the CRS was developed to allow students to register co-curricular activities through online system. It solved the long queue issue and the information on available seats left in a particular club was displayed to students. However, at that time, CRS was only used for co-curricular registration and download the name list of a club. The organizer had to record the activities and students' scores manually into Student Activity Card provided by the academic centre. Thus, to ease the process of score record, in 2016, the CRS was upgraded with a new function which allows the organizer to record student's total score in the CRS at the end of the semester.

Based on the previous CRS developed in 2016, the students can only know their final total score at the end of the semester, which could be too late for them to improve the score if they did not perform well. Since CRS will be used again by thousands of users at the academy centre every week, the process of recording student's score must be improved. To overcome this problem, in 2018, the CRS developers came out with the idea of using QR code as an approach to ease the marks recording process. The new system was successfully launched and used by thousands of users at the academy centre since June 2018 until today. However, the developers wish to know the effectiveness of using CRS from students' perspectives and their intention to use CRS again in the future. Therefore, this study was conducted with several objectives as follows.

Objectives:

1. To determine the effect of perceived ease of use on user's attitude to use CRS.
2. To determine the effect of perceived usefulness on user's attitude to use CRS.
3. To examine the effects of system quality towards perceived ease of use and perceived usefulness.
4. To examine the effects of perceived ease of use and perceived usefulness on user's intention to use QR code in CRS.

Hypothesis:

H1 : Perceived ease of use positively influences user's attitude to use CRS.

H2 : Perceived usefulness positively influences user's attitude to use CRS.

H3 : System quality positively influences perceived ease of use and perceived usefulness.

H4 : Perceived ease of use and perceived usefulness positively influence user's intention to use QR code in CRS.

Co-Curricular Registration System

The CRS has three different types of user; student, organizer and administrator. The organizer refers to the lecturers and administration staff at the academic centre. The administrator is the person in charge who updates news and application status while maintaining the CRS. For this paper, only students' experiences and perceptions are discussed because the students interact most with CRS starting from co-curricular activity registration until the time when their marks are uploaded into the system.

In CRS, the students are allowed to view which co-curricular activity they are interested in and still available for them to choose to sign up. The sign up period is during the first two weeks of the first semester. During this time, the students are allowed to change the co-curricular activity of their choice multiple times. Next, after the registration period is closed, the organizer starts to advertise activities on CRS site and it is opened to all students to participate.

From an interface provided in the student menu, the information on the list of upcoming activities is shown and the students can choose which activity they want to join from the list. Before the

students go to a particular activity, they are required to download a Quick Response Code (QR) from the activity list. The QR code will then be used by the organizing committee to record students' attendance and marks automatically into the CRS. Many institutions have used the advantage of QR code concept to record students' attendance to lecture. For example, Fadi *et al.*, [12] developed an online system to record students' attendance to a lecture using QR code along with GPS technology to ensure the student accesses the QR code in the lecture room. However, no research has been carried out to examine the usefulness of QR code in the context of recording students' co-curricular activity marks. Various agencies, marketers and companies allow users to access their product information through the same QR code image. This method is also similar to most institutions that use QR code concept to record students' attendance to lecture. Differently in CRS, the students need to download a unique QR code that is assigned individually to each student and each activity. This QR code contains a combination of unique student identification number and activity identification number.

2. Literature Review

Quick Response Code

The fact that many people are having smartphone with camera and Internet access has changed the way how people get information and services. The Quick Response (QR) code has been widely used globally from businesses and retails to a platform where it is conveniently used to delivery almost any information about a service or product. On the marketer side, it is much easier to reach potential buyer to promote products and services, while on the customer side, it is always a convenient way to get information about anything through their smartphones without any hassle such as sign-up or log-in process.

Despite of QR code comes in many forms such as micro, iQR, Frame QR to fit with different services, the ease to get the QR code generator has made this technology expand to almost every sector of industry. Research by Teuta *et al.*, [18] found that the use of QR code in business had made an effective communication between the marketer and the buyer.

There are many free online QR code generators available for user to create one. The image of the QR code contains the link of a webpage about a product or service, and it can be easily shared with others through instant messaging, print on product packaging or flyers. Each QR code is unique for each webpage. A mobile application of QR code reader must be installed in a smartphone with camera to capture the image of the QR code which then will automatically bring the user to a webpage.

Technology Acceptance Model (TAM)

The development of information and communication technology has greatly influenced the culture of today's life. The field of education in particular, the application of this technology in teaching and learning provides a new shift in the pedagogy techniques of all fields of work. In areas of education as well, the students' learning and the educational approaches are in line with today's technology. According to several previous studies, it has been proven that the use of technology has revolutionized the way human beings work in all areas.

From the literature, there are many models and frameworks have been used to show an effectiveness of user adoption to the new technologies. One of the suitable models to measure the user satisfaction on using the new technology is TAM model. This model was used to identify factors that affect users' technology acceptance. Based on TAM [5], the model was created to measures

users' acceptance or rejection towards information technology. Refer to Davis *et al.*, [6], TAM model was used to describe the behavior of people in using computer across the broad range of end-user computing technologies and user populations. According to Taherdoost [16], TAM model was created based on Theory of Reasoned Action (TRA) model. In TRA model, any human behavior is predicted and explained through three main cognitive components; person's feeling on the technology, social influence and intentions to make a decision. However, TAM model tells that motivation of user can be measured from three factors which are perceived usefulness, perceived ease of use and attitude toward use.

It has been widely used in many studies to identify users' acceptance in online banking system, e-learning system, health care management system and more. Park [13] also stated that TAM is most widely applied model to explain and predict intentions and acceptance behaviors of Information Communication Technology (ICTs). Wong *et al.*, [19], mentioned that TAM model was used by most people for more than two decades in proving users' acceptance to a particular system. Perceived ease of use and perceived usefulness act as internal variables that influence attitude and intention to use. Perceived ease of use defines the degree to which user believes using the technology will be uncomplicated and requires less user's effort whereas perceived usefulness defines the degree where user believes to which extend the technology will effectively enhance their work. Yang *et al.*, [20], mentioned that in a web-based environment, easy to navigate around, well-structured content and minimal effort user's put on to complete the online tasks are the characteristics of ease of use. While Zhang *et al.*, [21], in their study using TAM in e-learning environment also said that perceived ease of use is how the e-learning system make students feel less burden in learning process, the system interface should be friendly, easy to understand, and navigate, as well as provide maximum handiness in operation. Perceive usefulness is what students think the e-learning is helpful for them to complete school task. Usefulness of e-learning contributed to great impact on students' learning behavior and learning quality.

In addition, TAM model also consider external variables such as user training, system characteristics, user participation in design and the implementation process nature [10]. Erne *et al.*, [7] implemented trust as external variable in measuring users' satisfaction whereas Tang *et al.*, [17], found trust has positive influence towards perceived usefulness and perceived ease of use. Other researchers also included experience as the external factor in their study which then was found has the relationship with perceive ease of use and intention to use online system [9]. Other external variable such as computer literacy and self-efficacy also were used as a construct to predict the users' perceive ease of use and perceived usefulness in e-learning [8,1].

3. Research Design and Methodology

This quantitative research was conducted using a set of questionnaire that consisted 21 questions to identify the users' experience in using the online CRS. A five-likert scale measurement was used in the questionnaire which indicated Strongly Disagree – 1, Disagree – 2, Undecided – 3, Agree – 4 and Strongly Agree - 5. To answer the objectives of this study, Technology Acceptance Model (TAM) was used. This study includes perceived ease of use and perceived usefulness which act as internal variables that influence attitude and intention to use. The TAM model mentioned there may be external variable that acts on the two main internal variables, thus this study includes system quality as the external variable to identify how it will influence perceived ease of use and perceived usefulness. In this study also wants to explore how perceived ease of use and perceived usefulness will effect users' attitude. The intention of using the co-curriculum system again in the future was assumed to have relationship with the users' attitude.

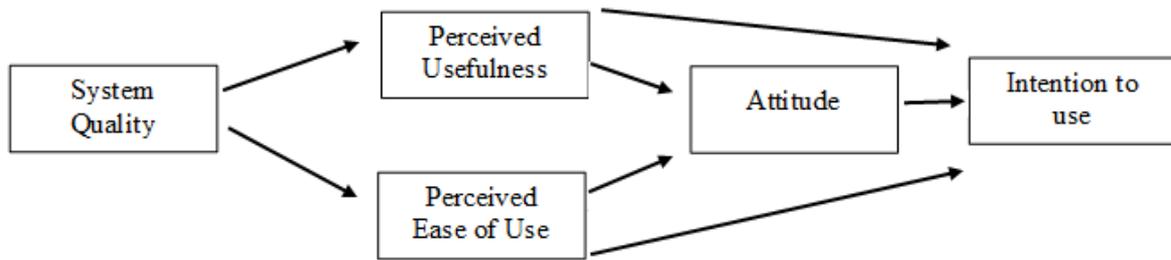


Fig. 1. Technology Acceptance Model (TAM) Framework

The data were collected from 604 students a month after the CRS was used by the students at the academy centre. The respondents of this study had experience in using all the functionalities in the online CRS such as register for co-curricular activity, view available activities advertised by organizer, download Quick Response (QR) code for attendance record and view co-curricular total marks. The structure of the questionnaire was broken into five domains; perceived ease of use, perceived usefulness, attitude, system quality and intention to use. The questionnaire items were categorized according to the five domains as shown in findings section. The statistical analyses which included reliability coefficient, normality test, descriptive statistics and correlation coefficient were run using Statistical Package for Social Sciences (SPSS) version 25.

4. Findings

Table 1
 Reliability Coefficient

Scale	Alpha value	No. of Item
Perceived Ease of Use	0.842	7
Perceived Usefulness	0.791	5
Attitude	0.768	3
System Quality	0.783	4
Intention to use	0.595	2

The Cronbach’s alpha for all scales was more than 0.7 which indicated that the items of the questionnaire had high reliability except for intention to use which had a moderate reliability for this study. Hinton *et al.*, [11] stated that the Cronbach’s alpha threshold for high reliability is from 0.7 – 0.9 whereas moderate reliability is from 0.5 – 0.7. Therefore, the items of the questionnaire used in this study can be used for further statistical analysis.

Table 2
 Normality Test

	Statistic	Shapiro-Wilk	
		df	Sig.
Perceived Ease of Use	.976	604	.000
Perceived Usefulness	.959	604	.000
Attitude	.940	604	.000
System Quality	.980	604	.000
Intention to use	.944	604	.000

From the table, the significant value for each variable was less than 0.05 (sig. value = 0.000). Thus, all the variables were not normally distributed. Based on this normality test result, it showed that this study had a non-parametric data. Therefore, Spearman's rank test was carried out to test the hypotheses.

Hypothesis Testing

In Spearman's rank analysis, the coefficient correlation (r-value) was used to indicate the strength of the correlation between the two variables. The closer the r-value to +1 indicates stronger positive correlation, while the closer the r-value to -1 indicates stronger negative correlation and 0 indicates no correlation [4,15].

Table 3
 Mean Statistics for Items of the Domain

	Item	Mean
Perceived Ease Of Use	1. I feel that using CRS was easy for me to register my co-curricular activities.	3.9818
	2. I feel that my interaction with CRS is clear and understandable.	3.8609
	3. I found CRS is good in terms of listing available activities and participant quota.	3.9205
	4. I always use CRS to get the list of future activities posted by co-curricular supervisors.	3.4934
	5. It was easy for me to register co-curricular activities of my choice using CRS.	3.8179
	6. The QR code functionality in CRS was easy to get.	3.6523
	7. I have no problem to use QR code for attendance registration to any co-curricular activity.	3.6175
Perceived Usefulness	8. Using CRS enabled me to accomplish my co-curricular registration more quickly	3.9305
	9. Using QR code enhanced the effectiveness on the co-curricular attendance and marks entry.	3.8808
	10. Using CRS made it easier for me to keep track my co-curricular marks.	4.0927
	11. I found CRS to be useful to get the latest information on any co-curricular activities.	3.8146
	12. I found CRS to be effective in delivering updated co-curricular activities and my co-curricular marks.	3.8588
Attitude toward Using (ATT)	13. I believe it is a good idea to use an Online CRS to register co-curricular and get updates on any information.	3.9520
	14. I love the idea of using QR code to register my attendance to a co-curricular activity.	3.9172
	15. Using all the functionalities in the CRS is a positive idea	3.9205
System Quality (SQ)	16. I am satisfied with the implementation of QR code in the CRS.	3.7119
	17. I am satisfied with the Internet speed while accessing CRS.	2.5728
	18. I am satisfied with the CRS flow from registering co-curricular activity, attending activity, registering attendance to the time when I view updates of my marks.	3.6457
	19. I am satisfied with the CRS interaction (menu, website, error messages)	3.5960
Intention to Use (ITU)	20. I prefer to choose QR code method if there is more QR code scanner provided at the big co-curricular event.	4.1523

21. I would be more than happy to use the QR code method if the Intranet connection is in high speed.	4.6440
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Table 4
 Correlation between Perceived Ease of Use and Attitude

		Perceived Ease of Use	Attitude
Perceived Ease of Use	Correlation Coefficient	1.000	.725
	Sig. (2-tailed)	.	.000
	N	604	604

Based on the table above, the significant value (0.000) was less than the alpha value (0.05) indicating that hypothesis (H1) was accepted. Meanwhile, the correlation coefficient value was high ($r = 0.725$) indicating that there was a strong positive correlation between perceived ease of use and positive attitude towards Co-curricular registration system.

Table 5
 Correlation between Perceived Usefulness and Attitude

		Perceived Usefulness	Attitude
Perceived Usefulness	Correlation Coefficient	1.000	.786
	Sig. (2-tailed)	.	.000
	N	604	604

Table 5 shows the significant value was less than alpha value (sig. value $0.000 < 0.05$) and the correlation coefficient value was large ($r = 0.786$), thus hypothesis (H2) was accepted which indicated there was a strong correlation between perceived usefulness and positive attitude towards Co-curricular registration system. Moreover, all the items in perceived usefulness had high scores (m is more than 3.50) and so do the items in attitude domain.

Table 6
 Correlation between System Quality and Perceived Ease of Use and Perceived Usefulness

		Perceived Ease of Use	Perceived Usefulness
System Quality	Correlation Coefficient	.688	.694
	Sig. (2-tailed)	.000	.000
	N	604	604

Both significant values shown in table 6 were less than alpha value (sig. value $0.000 < 0.05$) while the correlation coefficient value of system quality with perceived ease of use was large ($r = 0.68$) and the correlation coefficient value of system quality with perceived usefulness was higher ($r = 0.694$). Thus, hypothesis (H3) was accepted which indicated there was a strong correlation between system quality and perceived ease of use as well as between system quality and perceived usefulness.

To support the hypothesis, the findings in table 3 showed that users had high satisfaction on the implementation of QR code in the CRS and the process from accessing the system for co-curricular activity registration until the process of viewing their marks from time to time. Meanwhile, the second item in this domain which was about the network connection speed had a moderate satisfactory score ($m = 2,5728$). This finding indicates that the users were not fully satisfied with the Internet connection in the campus; thus, the administrator must take an action to solve this matter.

Table 7
 Users' perceived ease of use and usefulness of QR code in CRS

	Item	Mean
Perceived Ease Of Use	6. The QR code functionality in CRS was easy to get.	3.6523
	7. I have no problem to use QR code for attendance registration to any co-curricular activity.	3.6175
Perceived Usefulness	9. Using QR code enhances the effectiveness of co-curricular attendance and marks entry.	3.8808

The mean score of all three items on the use of QR code in CRS was more than 3.50 and considered as high score [14]. The score on item perceived usefulness of QR code was higher than perceived ease of use but they were not much difference. These findings indicate that the users agreed QR code was easy to be downloaded from CRS without any problem and they admitted the effectiveness of using QR code to record attendance and marks into CRS.

Table 8
 Correlation between Perceived Ease of Use, Perceived Usefulness and Intention to Use QR code in CRS

		Intention to Use
Perceived Usefulness	Correlation Coefficient	.393**
	Sig. (2-tailed)	.000
	N	604
Perceived Ease of Use	Correlation Coefficient	.342**
	Sig. (2-tailed)	.000
	N	604

Based on the table above, the significant value (0.000) of perceived usefulness and perceived ease of use with intention to use was less than the alpha value (0.05) which indicated that the variables were correlated. Meanwhile, the correlation coefficient value of perceived usefulness and intention to use was moderate ($r = 0.393$) but higher than correlation coefficient value of perceived ease of use and intention to use ($r = 0.342$). Consequently, it indicated that there was a positive correlation between perceived usefulness, perceived ease of use with the intention to use QR code in co-curricular registration system.

5. Discussion

The functionalities in CRS such as view list of activities posted by the organizer were agreed by students as easy to use as well as the interactions with the interface were clear and easy to understand which made the users feel it was good to use online CRS for their co-curricular activity record. Students also agreed that it was easy to use CRS to register their co-curricular activities which then positively affected their perception on using CRS as a medium to register co-curricular activity and get updates on any information. These proved that perceive ease of use had a strong positive effect on user's attitude to use the CRS. As the functionalities of the system were easier and more convenient to be used by the user, it also increased the user's positive attitude towards using the system in the future. This finding aligned with result found by Yang *et al.*, [20], ease of use is the important key factor that will attract new users and experience users to use online system again. Abdullah *et al.*, [1] also mentioned in their study that online system designer must create an easy-to-follow interface to give user good experience while using the system which also aligned with the result of this study.

Result from this study showed that the users feel CRS has improved their work performance while signing up as a member of a co-curricular club, getting the latest information about club activity and

effectively enhancing the automation of mark record into the system. The findings indicated that the effectiveness of CRS in enhancing user's task has influence towards users' attitude to believe that using CRS is a positive idea. From the positive impact of this finding, when the user's work performance increased, it also contributes to user's intention to use the system again in the future. This result was consistent with Al-Sharafi *et al.*, [1] and Al-Adwan *et al.*, [2] which showed that perceived usefulness influences user's intention to use the online system.

The result showed positive correlations between perceived ease of use, perceived usefulness and intention to use but not as high as other variables. The number of device to read the QR code during a big event and the network connection speed in the campus are the two factors highlighted to contribute to user's intention to use the system. Zhang *et al.*, [21] also mentioned similar result where e-learning system relies on a good network in the school, the students will experience a better learning environment when the network is excellent and increase students' intention during lesson. Thus, the system administration and event organizer of CRS should make an effort to improve their services to attract users to use the system.

The use of QR code as a way to record student's attendance and automatic mark record was taking the fact that most users have smartphones nowadays. This is in line with the finding that showed users' felt easy and effective to use QR code right from their smartphone to CRS. This method drove the users to get updated score from the CRS once their QR code was scanned. The benefits of using QR code were instantly experienced by the users which also led to beliefs that it is one of the factors to maintain users' intention to use this functionality again in the future. This is also agreed by Asare and Asare [3] who stated that to ensure continuous usage of scanning QR code to access online system, perceived usefulness and perceive ease of use are the big things to take care of. Other than that, the system quality positively influences perceive ease of use and perceive usefulness. This signifies system quality as one of the important factors that could indirectly influence users' attitude towards using CRS and their intention to use QR code again in the future. Adding to this, Yang *et al.*, [20] also mentioned that ease of use and system quality have influence on each other. Erne Suzila Kassim *et al.*, [7] stated an online system with a good quality enhanced the task process and a friendly user interface contributed to behavioral intention to use the online system.

Despite of all these constructs discussed, there are many other mediating constructs that could act as contributor to attitude and intention to use an online system, such as trust, computer anxiety, perceived enjoyment, awareness and more. Therefore, this research suggest future study to include other mediating constructs to understand better individual behavior toward using online system.

6. Conclusion

This study uses TAM framework to test users' acceptance and perception towards CRS. As the online registration for academic or non-academic emerged, administrators and system developers were called to have a set of way to assess the system functionalities acceptance from users' point of view. The methodology and finding of this study could be used as a reference for other system developers to conduct assessment on their system. The feasibility in using an online system is the most important aspect for users to keep using the system. Therefore, the design of the functionalities including the user interface, user interaction and system layout are the most important factors to be considered when developing an online system. Moreover, the response time of the system also plays an important role to give users a satisfactory experience while using the system. Meanwhile, there is a positive believe that in using QR code for automation storing mark into database, the operational of registering the attendees to a bigger event must be more systematic. The administrative of CRS should emphasize the system quality especially on network speed to access to the system and a

sufficient number of devices provided to read the QR code must be taken into consideration to avoid users' frustration.

Particularly, it should be noted that perceived ease of use and perceived usefulness are the key factors that should coexist together to contribute to users' positive attitude toward using the CRS and intention to use QR code in the system.

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