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MYKITS – KERNEL INTEGRATION TOOL FOR SPREADSHEET: A FEASIBILITY STUDY IN KOLEJ POLY-TECH MARA IPOH

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ABSTRACT

The utilization of technology in student's information management is no longer a vision, but a necessity to every higher education provider. One of the vital student's information management is the marks management. Current practice in Kolej Poly-Tech MARA is dual manual entry of marks to two different platforms; SPMP and MDR. This reduces productivity of the teaching staff as it time consuming and prone to error. Due to this problem, MyKITS is created to integrate between these two platforms so that the error can be minimized. This study is the feasibility of using MyKITS among the teaching staff in KPTM Ipoh in academic session November 2023. The findings from the thematic analysis based on the experiences of usage found that the use of MyKITS in marks management is efficient, time saving and reduce the error. This study is important to proceed the innovation for pilot study of field study and bigger sample to test the effectiveness of MyKITS

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1.0 INTRODUCTION

Student management system is one of the pillars in higher institutions to ensure effectiveness of record keeping and student information management system. The features and characteristics of student management system and its interface must be top notch for best user interface and user experience. One of the important features is marks management system. As the higher education system in Malaysia is still implementing assessments to evaluate student performance and their learning outcomes, the marks from the evaluation system must be administered carefully. The evaluations of the assessments are following the marking rubrics provided by Faculties of the respective programs and thus, the management of student marks is a continuous process and needs to be improvised over time.

Kolej Poly-Tech MARA, the subsidiary of Institusi Pengajian MARA (IPMA) is aware of the importances of marks management system hence Sistem Pengurusan Maklumat Pelajar (SPMP) is used for this purpose. Kolej Poly-Tech MARA have six branches in Malaysia offering diverse programs for SPM leavers to further their studies. One of the MARA Strategic Plan 2021-2025 is Thrust 4: Strengthen the Communication and Governance also can be achieved by the Strategic 15 – on utilizing the technology in all service ecosystem, including education. To achieve this aspiration, one innovative system has been created in KPTM Ipoh.

Kolej Poly-Tech Mara Ipoh (KPTM Ipoh) is a tertiary education facility situated in Ipoh, Perak, Malaysia. KPTM Ipoh provides a range of diploma in areas like computer science, languages, management, education, and creative art, parallel with the industry demand. The programs are designed to meet the industry requirement and embracing Industrial Revolution 4.0 (IR4.0), thus enable the graduands to polish their skills and unleash their potentials. The programs are designed by following the standards and guidelines by Ministry of Higher Education (MOHE) and program standards by Malaysian Qualification Agency (MQA). The guidelines and program standards require the higher education provider (HEP) to conduct assessments; formative and summative assessments so that the courses offered in the programs achieves the course learning outcome (CLO). The assessment evaluation and classroom management in KPTM Ipoh always follows the procedure and guidelines stipulated by the management to ensure transparency and integrity. This is to ensure the fairness of assessment evaluation and ensure that students get solid feedback of their works and tasks completed.

1.1 Problems in Existing System

In current practice of marks reporting in KPTM Ipoh, the lecturers are obliged to do dual entry, where the key-in of marks on the continuous assessment and formative assessment is performed through designated content management system (CMS) Student Information Management System, named SMPS (*Sistem Maklumat Pengurusan Pelajar*) and Microsoft Excel template named Marks Distribution Report (or MDR) which is distributed by the respective faculty to all branches of KPTM are used for this purpose.

However, the manual and dual entry of these two platforms cause inconvenience among the lecturers. This manual dual entry is needed to complete the lackness of each system but cause a hassle to the teaching staff. This repetitive tasks exposed to human error, typo error, time consuming, even worse when the teaching staff have several class sections with hundreds of students. Additionally, it can be cumbersome when there are repeaters in the class section as it required the particular teaching staff to separate the MDR for different cohort of students for one subject.

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1.2 Research Objective

To overcome all these issues, one innovation is developed, named MyKITS – Kernel Integration Tool for Spreadsheets. Thus this study intends to test the feasibility of MyKITS for student’s marks management to the teaching staff, particularly on academic session Nov 2023 in KPTM Ipoh.

2.0 LITERATURE REVIEW

2.1 Student Management System

Most of student management system in education sector has been used widely to manage the student’s information such as their details, assessment marks, attendance records, academic advisory, grading and many more. The use of student management system reduces the multiple systems and multiple documents which can be implemented in one-stop platform. This is to reduce the repetitive works by teaching staff of manual entry into excel sheet. The manual typing or manual entry into excel sheet exposed the academic staff to error which could jeopardize the whole pipeline of student grading (Ali et al., 2019; Singh & Dev, 2023).

In current practice of KPTM Ipoh, teaching staff have to do dual entry in both SPMP and MDR and ensure that both entries have the exact and precise value of assessment marks. This process involves much clerical work and prone to error. Thus, to solve this problem, MyKITS is introduced where the integration of the two systems can be implemented in speed.

2.2 Innovation Creation

MyKITS is an innovation designed to facilitate SPMP users in entering data from Excel files or HTML table data codes.

2.2.1 Originality of the innovation

In this context, there are other platforms that offer similar solutions, but the flexibility they offer is limited and can only function according to the provided platform. This project is unique because of its focus on flexibility in data transfer from spreadsheet files and its user-friendly capability for seamless data conversion automation into any Content Management System (CMS). MyKITS can facilitate direct data entry into the CMS platform, making it different from competing initiatives in the market. By prioritizing flexibility and user-friendliness, MyKITS offers a different approach to data management, empowering users to efficiently input and integrate data into the CMS system.

2.2.2 The utilization of innovation

Before MyKITS was developed, the process of grading assignments at KPTM Ipoh was a task that reduced productivity and efficiency within the organization.

Observations on assignment grading at KPTM Ipoh roughly indicate that a lecturer is typically responsible for teaching and managing 4 classes, with an average of 30 students per class. Thus, the total number of students to be managed is 120. Meanwhile, for each subject, there are approximately 4 learning assessments

from students such as quizzes, exams, coursework, and projects. Therefore, it can be calculated that before the existence of MyKITS, lecturers needed to copy and input approximately 480 student grades per semester into the SPMP.

The time taken to input 1 student grade into the SPMP is estimated to range from about 15 seconds to 30 seconds. Therefore, making minimum and maximum calculations for the total time taken to input grades is as follows:

The minimum amount of time required for manual data entry:

$$480 \text{ grades} \times 15 \text{ seconds} = 7200 \text{ seconds} / 120 \text{ minutes} / 2 \text{ hours}$$

The maximum amount of time required for manual data entry :

$$480 \text{ grades} \times 30 \text{ seconds} = 14400 \text{ seconds} / 240 \text{ minutes} / 4 \text{ hours}$$

On the other hand, a significant difference can be observed in the grading entry process using MyKITS. The advantage of MyKITS, which is capable of handling thousands of records, results in the time required for data entry depending on the CMS's ability to store a volume of data according to the frequency of usage. Thus, the same scenarios as above can be utilized, also considering the amount of time taken for grading entry using MyKITS based on the number of actions. Based on the provided scenarios, the SPMP's process of storing student grades can be divided into two actions, based on the number of classes or the number of learning assessments.

The frequency of MyKITS usage according to the number of classes:

$$480 \text{ grades} / (30 \text{ student's} \times 4 \text{ classes}) \times 4 \text{ assessments} = 16 \text{ times of usage}$$

The frequency of MyKITS usage according to the number of learning assessments:

$$480 \text{ grades} / (120 \text{ student's} \times 4 \text{ assessments}) \times 4 \text{ classes} = 4 \text{ times of usage}$$

To calculate the total time of usage, roughly, a lecturer only needs 1 minute for minimum time or 5 minutes for maximum time for entering grades into the SPMP per usage of MyKITS. Therefore, if the time for grading entry into the SPMP depends on the number of usages, the scenarios above result in MyKITS usage for learning assessments requiring a minimum time of 4 minutes to 20 minutes. Meanwhile, 16 minutes to 80 minutes are required for grading entry based on the number of classes in MyKITS usage. The diagram below illustrates the comparison of the total time for grading entry between manual and MyKITS usage.

Figure 1 illustrates a significant difference in the total time required for grading entry into the SPMP between the manual procedure and MyKITS across different scopes of entry. Therefore, this observational study has demonstrated the effectiveness of MyKITS in assisting lecturers and users in entering grades or data into the SPMP.

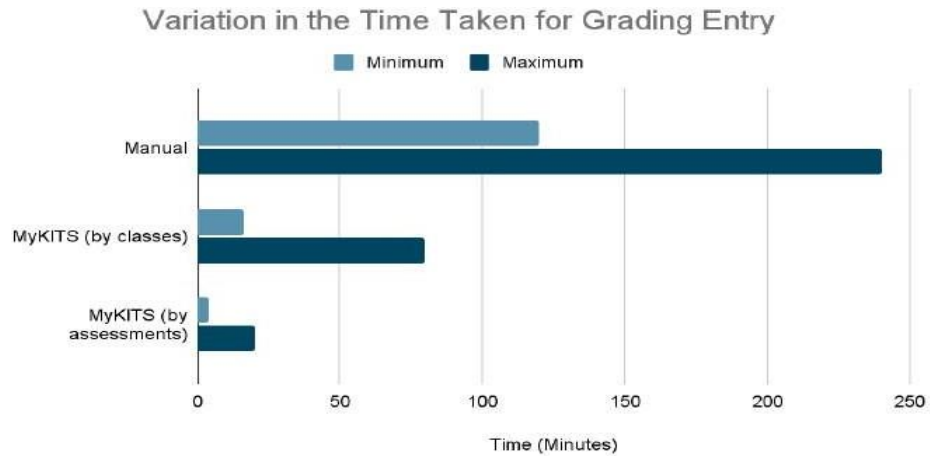


Figure 1: Variation in the total time for grading entry

From the beginning, SPMP users have been using the manual method to input data from Microsoft Excel. No updates have been implemented. Instead, the workload has increased due to management requirements. Therefore, with the introduction of MyKITS, it is hoped that the updates in data management systems in an institution will have a significant impact on both the users and the organization.

2.2.3 Steps of Using MyKITS

Step 1: Upload

Users can upload MDR files or HTML table data codes. The files or data codes will not be stored anywhere. They are only used when the user utilizes MyKITS.



Figure 2: Upload Section for MDR files or HTML table data codes.

Step 2: Visualization

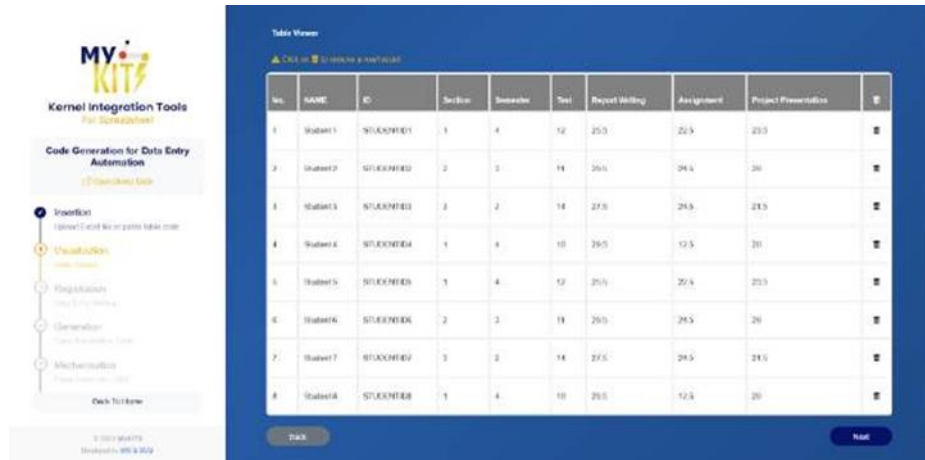


Figure 3: Data visualization section from the uploaded MDR; Microsoft Excel file or HTML table data code.

This section will visualize data from the uploaded MDR (Microsoft Excel file or HTML) table data code. Users can remove any records or table headers before proceeding to the next step.

Step 3: Column setting

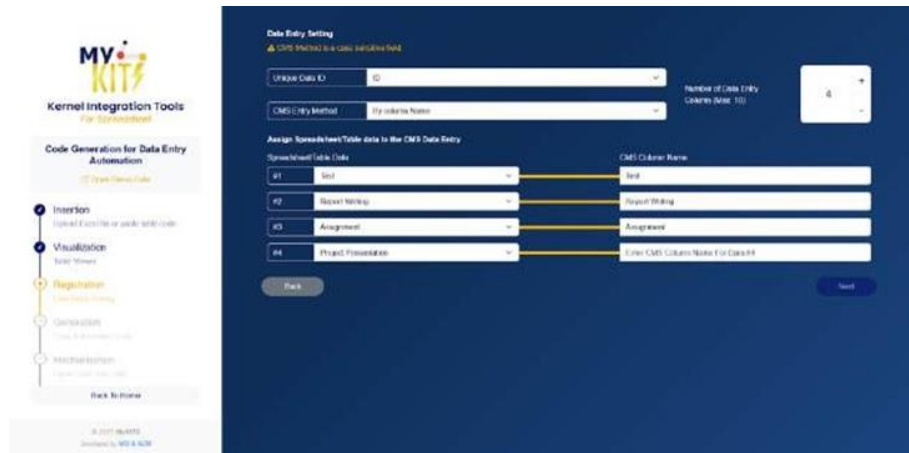


Figure 4: Setting column section from the table data according to the SPMP columns.

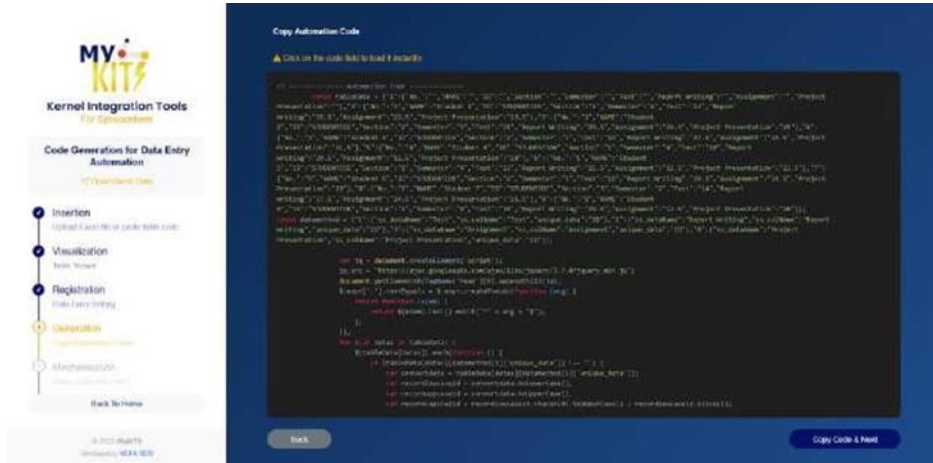
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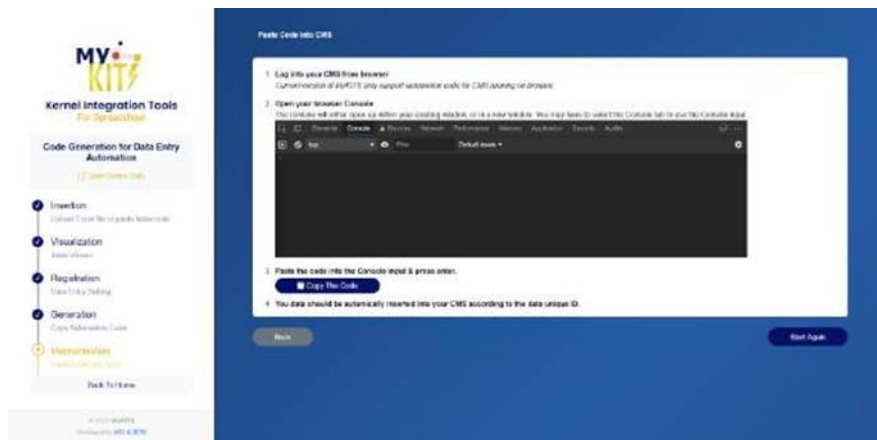
In this section, users will configure column settings and unique data to ensure that the table data follows the SPMP column settings. Users can configure up to 10 column settings.

Step 4: Automation Code



Automation code generation will occur. Users can still edit input data if corrections are needed. Users can click on the code space to expedite the automation code generation process.

Step 5: Mechanism



Users will be provided with guidance on how to input the automation code into the browser console, and a copy code button will also be provided for user convenience.

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2.3 Innovation Status

2.3.1 The Technology Readiness Level (TRL) of the innovation

Starting from Stage 1; Basic Principles Observed of the System/Technology, the problem statement before the development of MyKITS was discussed between the innovation developers and lecturers at KPTM Ipoh.

Subsequently, the innovation developers analyzed the problem, and the Basic Technology Concept was developed, indirectly reaching TRL Stage 2. At the same time, TRL Stage 3; Experimental Proof of Concept began with several tests conducted by the innovation developers.

After the System/Technology was validated in a real-world simulation environment, i.e., at TRL Stage 4, MyKITS was updated to be more user-friendly and ready to face the next TRL stage. And by TRL Stage 7, MyKITS proved to achieve the objectives of this innovation, and a prototype was internally implemented at KPTM Ipoh.



Figure 7: Multimedia teaching staff at KPTM Ipoh using MyKITS.



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Figure 8: Science Computer teaching staff at KPTM Ipoh using MyKITS.



Figure 9: Islamic studies teaching staff at KPTM Ipoh using MyKITS.

Although MyKITS is still at the prototype stage, it has already been adopted by teaching staffs regardless of their field, skills, and basic knowledge in computer technology

3.0 METHODOLOGY

3.1 Feasibility Study of MyKITS

Feasibility study is used to determine whether an innovation is applicable for further testing. Researchers can assess if the innovation can be shaped to be relevant and sustainable in the future. (Bowen et al., 2009). There are eight areas that can be examined through feasibility studies such as acceptability of the innovation, the demand, implementation, practicality, adaptation, integration, expansion, and limited-efficacy testing. In this case, MyKITS can be tested for limited efficacy testing because the innovation is tested in limited setting, i.e. KPTM IPOH. (Bowen et al., 2009).

The sampling for the feasibility can be convenience sample, which is also the preliminary evaluation of participant responses (Orsmond & Cohn, 2015). In this study, only 20 teaching staff of KPTM Ipoh were selected. These teaching staff has used the MyKITS for academic session Nov 2023.

3.2 Data analysis

The instrument to test the practicality of MyKITS is using survey by open-ended question and categorical measurements. Hence, the data will be analyzed based on thematic analysis following the steps by Maguire & Delahunt (2017). The use of this approach is considered appropriate for qualitative data to achieve the objective of this study.

4.0 FINDINGS AND DISCUSSION

4.1. Departments of the Respondents

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The 20 respondents come from 6 teaching staff of Department of Multimedia, 2 teaching staff of Department of Mathematics and Computer Science, 7 teaching staff from Department of Social Science and 5 teaching staff of Department of Education.

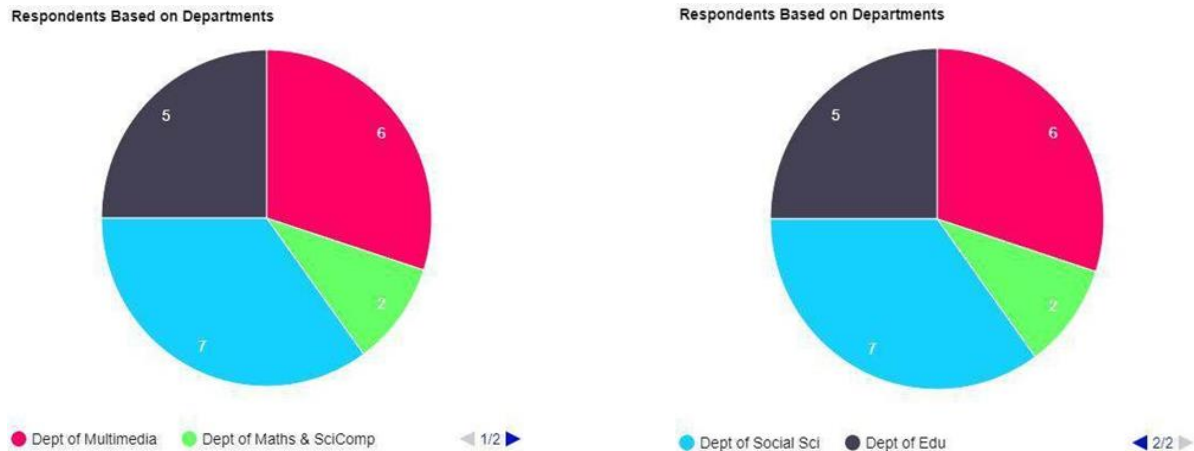


Figure 10: Respondents Based on Academic Departments in KPTM Ipoh

4.2 Difficulties of Manual Marks Entry

The respondents are asked about the difficulties of manual marks entries for both platform; SPMP and MDR. Only two respondents answer that manual dual entries is not difficult at all. Other respondents had stated that this method is vulnerable to the mistakes, time consuming, tedious, and the entry will be different if there are repeaters in the class sections because the MDR for different cohort of students need to be filled separately

4.3 The feasibility of MyKITS to the Marks Entry

The respondents are asked the viability of MyKITS to the dual marks entry, either SPMP-MDR or MDR-SPMP. There are two themes emerge from the responses:

- (2) Save time – 8 responses.
- (3) Reduce error – 12 responses.

(Note: Some of responses are overlapped, which means the respondent answer both in their response)

The respondents had answer that “proses menjadi lebih cepat dan mudah”, “menjimatkan masa dan mengurangkan risiko kesilapan memasukkan markah”, “...sangat pantas memasukkan markah ke dalam system tanpa berlakunya kesilapan data”

4.4 Experience of Using MyKITS

The researcher asked the respondents of their experience in using MyKITS and three themes emerge; (1) efficient (2) reduce error (3) time saving.

The efficiency of MyKITS according to the respondents are..”sangat efisien”, “Ia sangat membantu”, “perlu faham kaedah dan proses, selepas itu ia sangat memudahkan”, “Sangat berguna dan semoga lebih banyak

kemudahan feature yang boleh disediakan,” “menyelesaikan masalah dengan terbaik”, “Untuk pengguna MyKITS pertama sekali dapat mengurangkan masalah skrol terlalu banyak, menjimatkan masa, tak perlu saya nak berulang kali menyemak nama pelajar untuk setiap jenis assessment dan masukan markah satu persatu dalam kotak kecil yang disediakan. Cuba bayangkan sekiranya untuk satu subjek terdapat 5-6 assessment berbeza ini bermakna satu nama saya perlu semak 6 kali dari kiri ke kanan dengan paparan skrin yang kecil dan sempit dan perlu buka tab browser beserta excel menjadikan ia lebih tidak mesra paparan. Ditambah pula SPMP ini tidak begitu screen responsive bagi data yang banyak membuatkan ianya menjadi satu lagi kekangan yang mengambil masa yang lama. Saya ini pengguna skrin yang mempunyai masalah silau mata dan mata kering. Sekiranya perlu fokus yang terlalu lama membuatkan mata saya cepat merah, kering dan juga pening kepala. Terima kasih MyKITS, namun MyKiTS juga mempunyai ruang dan potensi untuk di pertingkatkan.”, “tahniah, sangat memudahkan!”

The theme of reducing error using MyKITS, among the response are, “..... menjimatkan masa dan merendahkan risiko bagi kesilapan memasukkan nilai markah pelajar”, “Sangat membantu dalam kebolehpayaan kemasukan data dan mengelakkan kekerapan kesilapan kemasukan data” “Memudahkan kerja, tidak membazir masa.”, “Sangat bagus ! Dan jimat masa ketika memasukkan markah menggunakan MyKITS”.

The theme of time saving using MyKITS can be concluded from these responses, “Menjimatkan masa....” (4 responses), “.....masa kemasukan data dapat di jimatkan.”, “....tidak membazir masa.”

5.0 CONCLUSION

This study tests the feasibility of the innovation on student’s marks management system. MyKITS is invented to solve the problem of manual dual entry for both platforms; SPMP and MDR, especially for academic session November 2023 in KPTM Ipoh. This study has indicated that MyKITS is able to solve the hassle of dual manual marks entry. The experiences of teaching staff in using MyKITS has shown that the usage of MyKITS is very efficient, reduce error and time saving.

The importance of this study is to ensure that the feedback from feasibility of MyKITS can be used for pilot studies and field studies in bigger setting, i.e. all teaching staff in KPTM Ipoh for subsequent academic sessions. This can also ensure that the productivity of teaching staff in KPTM Ipoh is at the highest. Furthermore, this study enables the researchers to ensure its sustainability for academic management by improvising the innovation for its fullest potential in higher education institutions. Last but not least, this innovation is one of the efforts to achieve the MARA Strategic Plan 2021-2025, Strategic 15 – on utilizing the technology in all service ecosystem, including education.

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