

# Enhancing Efficiency in Preparing Junior High School Forms Using Macro-Enabled Workbook

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## Abstract

This study aimed to enhance the efficiency of preparing junior high school forms through automation using a macro-enabled workbook in Excel. The primary objective was to evaluate the workbook's effectiveness in terms of accuracy, efficiency, and ease of use, while also assessing its functionality, compatibility, and scalability. A mixed-methods approach was used to gather both qualitative and quantitative data through surveys and feedback. Twenty-four class advisers evaluated the macro-enabled workbook for accuracy, efficiency, and ease of use, while three ICT experts reviewed its functionality, compatibility, and scalability. A prototype was created, tested by five teachers, and refined based on their suggestions to better meet user needs. The workbook was introduced during a School Learning Action Cell (SLAC) session, where additional evaluation and feedback from advisers and ICT experts were analyzed to guide further improvements. The results revealed that the macro-enabled workbook received very high ratings from class advisers for accuracy, efficiency, and ease of use, with some variation noted in perceptions of ease of use. ANOVA analysis identified differences in perceptions, prompting a post-hoc analysis, which revealed no significant differences among the variables. ICT experts validated the workbook's functionality, compatibility, scalability highlighting its operational characteristics. Feedback from class advisers emphasized the need for comprehensive training to enhance ease of use, while ICT experts suggested addressing scalability and compatibility using online applications for broader application. The study highlighted the workbook's effectiveness in automating junior high school forms, offering practical solutions to enhance efficiency in their preparation.

*Keywords:* Automation; Efficiency; School Forms; Accuracy; Excel; Macros

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## 1. The Problem and its Background

This section introduces the problem, research questions, and proposed innovation.

### 1.1 Introduction

One of the challenges encountered by class advisers at the end of each school year is the preparation of school forms. This task consumes much time, especially in classes with more than 40 students. In recent years, this process has involved manual data entry on SF9 and cross-referencing with SF10 to ensure data alignment. Hence, requiring the class advisers significant time and effort.

To simplify this process, the Department of Education issued a directive (DepEd Order No. 11 s.2018 Guidelines on the Preparation and Checking of School Forms). The guidelines seek to reduce the time and effort spent by class advisers in record management while maintaining the accuracy of learners'

information indicated in SF9 and SF10. This ensures the quality of school forms and consistency among schools under the department.

Inaccuracy and inefficiency had always been the issue in completing the various school forms. Mistakes were made during the processing of school forms since they are done manually, which creates delays (Rusiana and Orale, 2023). The current method still entails redundant data entry across multiple school forms (Sumalinog and Lopez, 2024). This calls for a need for implementing an automated system which could improve the process efficiency by decreasing errors and saving time.

Automation is the use of technology to perform tasks with less to no human intervention. This approach aims to streamline processes, enhance efficiency, and reduce human error (Kanade, 2024). There are several tasks which could be streamlined in the generation of school forms. Some of these include autofill of known information from existing databases, dynamic fields that adapt based on user input or predefined conditions, real-time validation, integration with other systems or platforms (Monsalve, 2024).

The Los Baños National High School Poblacion is still far from automation. School form templates were printed and written with learners' information and grades. Cross-checking SF9 and SF10 was done to determine whether information was accurately written. Summaries including computations and day entry in School Forms 2 were also done manually, which also happens to be the most time-consuming task. These were just some of the activities done in preparing school forms that can be subjected to automation.

With these at hand, the proposed approach is to employ the developed Macro-enabled Workbook designed to automate School Forms 2, School Forms 9 and School Forms 10. This technique seeks to decrease repetition while encoding learners' information, grades and attendance, along with computations involved. By automating data entry, the proposed solution enhances accuracy and efficiency that will alleviate the manual workload associated with this form preparation.

### ***1.2 Research Questions***

This study aimed to develop and evaluate a macro-enabled workbook to be used in automating School Form 2, School Form 9 and School Form 10. Specifically, it sought to answer the following questions:

1. How do class advisers perceive the macro-enabled workbook's effectiveness in automating junior high school forms considering accuracy, efficiency, and ease of use?
2. To what extent do ICT experts agree that the macro-enabled workbook is functional, compatible and scalable?
3. What enhancements can be made to improve the macro-enabled workbook based on the class advisers' and ICT experts' feedback?

### ***1.3 Proposed Innovation, Intervention and Strategy***

The proposed innovation involved the development and evaluation of a macro-enabled workbook to automate the preparation of SF2, SF9 and SF10 to be used specifically by Junior High School class advisers. The goal of these automated forms was to enhance efficiency in preparing school forms by minimizing manual data entering. This solution aimed to save time and effort for class advisers, allowing them to focus on other administrative and teaching-related tasks. Evaluation of the macro-enabled workbook was conducted through statistical analysis of data gathered from surveys to class advisers and ICT experts of Los Baños National High School-Poblacion. Participants' feedback was used to identify possible improvements and adjustments to improve the efficiency of the junior high school form preparation.

## **2. Action Research Methods**

This section includes the participants of the study, research procedure, data gathering methods, and data analysis performed.

### **2.1 Participants and/or other Sources of Data and Information**

The study involved the population of twenty-four (24) class advisers of Los Baños National High School-Poblacion to rate the workbook in terms of accuracy of data reflected, efficient and easy to use. As to the operational characteristics of the macro-enabled workbook, three (3) ICT experts from the same school was purposively selected to evaluate the macro-enabled workbook in terms of functionality, compatibility and scalability.

### **2.2 Research Procedure**

The researcher conceptualized the study with the aim of enhancing efficiency in preparing school forms through automation using macro-enabled workbook. To achieve this, the researcher searched for related studies that identified tasks that could be streamlined through automation and the time spent in form preparation. Then, a prototype of the macro-enabled workbook was developed. It was then tested by five (5) teachers who provided on potential improvements. Revisions and modifications were made to address the users' needs.

The workbook was introduced to the population of class advisers during School Learning Action Cell (SLAC session). A survey form was distributed to evaluate the macro-enabled workbook in terms of data accuracy, efficiency and user-friendliness. In addition, a feedback survey was conducted to gather suggestions for further improvement. ICT experts also evaluated the macro-enabled workbook through a separate survey and feedback form. The results were analyzed to summarize the evaluation process and identify the potential design improvements for the macro-enabled workbook.

### **2.3 Data Gathering Methods**

This study used a mixed-methods approach in data gathering. The quantitative data was collected through a questionnaire administered to class advisers and ICT experts. The questionnaire includes likert-scale items to assess various aspects of the macro-enabled workbook's usability in terms of accuracy of data, efficiency, and ease of use for class advisers, and operational characteristics in terms of functionality, compatibility and scalability to be evaluated by ICT experts. Class advisers and ICT specialists were given feedback forms to collect qualitative data. This allowed for in-depth exploration of participants' perceptions, experiences, and recommendations for improvement regarding the macro-enabled workbook. This was to make it better suit their requirements and preferences.

### **2.3 Data Analysis**

This study took a mixed-methodological approach, including both quantitative and qualitative methods. Quantitative data analysis involved the calculation of weighted mean, standard deviation, one-way ANOVA and Welch's test. For qualitative data collection, feedback survey was utilized to gather points for improvement. The findings were merged to provide a comprehensive understanding of the usability and operational characteristics of the macro-enabled workbook and its potential improvement as suggested by the respondents.

## **3. Results and Discussion**

The researcher aimed to enhance efficiency in preparing junior high school forms through automation using macro-enabled workbook. Various tools were used to analyze and present the data gathered from the respondents. The evaluation on the workbook's accuracy, efficiency and user-friendliness, and the ICT's assessment of the macro-enabled workbook's operational characteristics as to functionality, compatibility and scalability laid foundation to potential design improvements of the macro-enabled workbook.

### 3.1 Rating of Class Advisers on using Macro-enabled Workbook on Junior High School Forms in terms of Accuracy

Table 1 presents the perceived effects of using macro-enabled workbook on automating Junior High School Forms in terms of accuracy as rated by class advisers. To be classified as accurate, the generated forms must reflect those data that are encoded and those from school form 1 and copy of grades across SF9, SF10 and learners' attendance on SF2. This criterion can be expanded by being error-free in terms of computation, reliable, no missing data, and are properly placed within the document.

**Table 1. Rating on the Macro-Enabled Workbook in Automating Junior High School Forms in Terms of Accuracy**

STATEMENT	WEIGHTED MEAN	Remarks
1. The macro enabled workbook reflects accurate data on the school forms.	4.96	Strongly Agree
2. The data and computations on the school forms are error free.	5.00	Strongly Agree
3. School forms generated from the macro enabled workbook has no missing data reflected.	4.96	Strongly Agree
4. The school forms generated from macro-enabled workbook is consistently reliable.	5.00	Strongly Agree
5. The data from the school forms generated from the macro enabled workbook matches the template and are properly placed.	5.00	Strongly Agree
<b>Overall SD</b>	<b>4.98 0.13</b>	<b>Very High</b>
<b>Legend:</b>		
<b>Scale</b>	<b>Remark</b>	<b>Verbal Interpretation</b>
4.20 – 5.00	Strongly Agree	Very High
3.40 – 4.19	Agree	High
2.60 – 3.39	Moderately Agree	Moderately High
1.80 – 2.59	Disagree	Low
1.00 – 1.79	Strongly Disagree	Very Low

The macro-enabled workbook attained a very high rating of 5.00 from the class advisers in terms of its capability to reflect data accurately on the generated school forms. All the respondents strongly agreed that the data and computations on the school forms were error free. A weighted mean of 5.00, the users strongly agreed that the school forms generated from macro-enabled workbook is consistently reliable. In addition, the data from the school forms generated from the macro enabled workbook matches that of the template, and are properly placed, attaining a weighted mean of 5.00. A very high weighted mean rating of 4.96 implies that despite the difference in the numerical rating, the respondents still strongly agreed that the macro enabled workbook reflects accurate data on the school forms and it has no missing data reflected. It can be deduced that the forms generated by the macro-enabled workbook reflects accurate data.

Class advisers' overall ratings of 4.98 with standard deviation of 0.13 on using macro-enabled workbook in automating junior high school forms in terms of accuracy was remarked as very high. The results implied that the macro-enabled workbook reflect accurate data. There were no errors in computation, making it reliable. The data were also in its proper placement. Furthermore, its capability to display accurate data was highly praised.

In the published research study about streamlining DepEd School Forms, Monsalve (2024) mentioned that automating school forms do not just simplify the process but also reduce the risk of

committing mistakes and discrepancy in the generated forms, exemplifying an increased in the accuracy of data reflected on the school forms. To achieve this, the end-product must be error-free, reliable, complete and data are properly placed. This supports the findings of the study that the macro-enabled workbook adheres to a must-have characteristic of automation which is reflecting accurate data.

### 3.2 Rating of Class Advisers on using Macro-enabled Workbook on Junior High School Forms in terms of Efficiency

The perception using the macro-enabled workbook on automating junior high school forms in terms of efficiency is shown in the table. For each indicator, the weighted mean ratings and remarks are provided.

**Table 2. Rating on the Macro-Enabled Workbook in Automating Junior High School Forms in Terms of Efficiency**

STATEMENT	WEIGHTED MEAN	REMARKS
1. The macro-enabled workbook has significantly reduced the time required to complete School Forms (SF2, SF9, SF10, and Minicard).	5.00	Strongly Agree
2. Using the macro-enabled workbook reduces the time spent on data entry tasks.	5.00	Strongly Agree
3. Teachers reduced time in checking the data on SF9 and SF10 reports when using the macro-enabled workbook	5.00	Strongly Agree
4. The macro-enabled workbook reduces the time spent on formatting.	5.00	Strongly Agree
5. The macro-enabled workbook reduces time in importing student records from different sources.	4.88	Strongly Agree
<b>Overall</b>	<b>4.98</b>	<b>Very High</b>
<b>SD</b>	<b>0.13</b>	
<b>Legend:</b>		
<b>Scale</b>	<b>Remark</b>	<b>Verbal Interpretation</b>
4.20 – 5.00	Strongly Agree	Very High
3.40 – 4.19	Agree	High
2.60 – 3.39	Moderately Agree	Moderately High
1.80 – 2.59	Disagree	Low
1.00 – 1.79	Strongly Disagree	Very Low

By using the macro-enabled workbook in automating junior high school forms, the class advisers agreed that the time required to complete School Forms (SF2, SF9, SF10, and Minicard) is greatly reduced. A weighted mean rating of 5.00 supports the claim of greatly reducing the time spent on completing school forms. The respondents' rating on the ability of the workbook to lessen the time spent on data entry task is implying that using the macro-enabled workbook increases the efficiency in preparing school forms, attaining a weighted mean of 5.00. Considering the time spent on cross checking SF9 with SF10, users concurred it was lessened. The time spent on formatting is drastically reduced as implied by the users' 5.00 ratings. The probable reason for that very high rating could be attributed to the use of template sheet. However, the researcher must take into consideration its capability to reduce the time in importing student records from different sources. It is suggested to be improved, although it has attained a high mean agreeability of 4.88.

A 4.98 weighted mean rating and standard deviation of 0.13 on the process of generating school forms described the use of macro-enabled workbook to be very efficient. Its attribute to save time was

remarked as very high. This depicted that using the macro-enabled workbook reduced the time required to complete the school forms, minimized the time spent on data entry tasks, diminished the time in cross-checking SF9 with SF10, lessen the time spent on formatting, and lowered the time allocation in importing students' records from different sources.

Innovations contribute to making things easier to do. With the advent of technology, existing process of preparing school forms will be made possible through developing a system, maximizing excel formulas, macros and visual basic script (Nacional, 2022). This coincides with the study wherein the product is to develop a system that automates generation of school forms optimizing the use those suggested by Nacional. As per evaluation of the respondents, rating was found to be very high denoting the use of the macro-enabled workbook to be very efficient.

### **3.3 Rating of Class Advisers on using Macro-enabled Workbook on Junior High School Forms in terms of Ease of Use**

Class advisers evaluated the macro-enabled workbook being easy to use. The results were summarized in table 3 showing the weighted mean and remarks on each indicator.

**Table 3. Rating on the Macro-Enabled Workbook in Junior High School Forms in Terms of Ease of Use**

STATEMENT	WEIGHTED MEAN	REMARKS
1. Operating the macro-enabled workbook in automating school forms is easy.	4.83	Strongly Agree
2. The contents of the workbook can be easily viewed through its structured format.	4.92	Strongly Agree
3. The user can navigate well in each part of the workbook.	4.92	Strongly Agree
4. Buttons and links are up to date, enabling the user to be directed to the SF9, SF10 and SF2 template sheet.	4.92	Strongly Agree
5. The macro-enabled workbook contains visual cues and directions that easy to follow.	4.92	Strongly Agree
<b>Overall</b>	<b>4.90</b>	<b>Very High</b>
<b>SD</b>	<b>0.33</b>	
<b>Legend:</b>		
<b>Scale</b>	<b>Remark</b>	<b>Verbal Interpretation</b>
4.20 – 5.00	Strongly Agree	Very High
3.40 – 4.19	Agree	High
2.60 – 3.39	Moderately Agree	Moderately High
1.80 – 2.59	Disagree	Low
1.00 – 1.79	Strongly Disagree	Very Low

The respondents concurred that operating the macro-enabled workbook in automating school forms is easy, garnering a weighted mean of 4.83. This implies that the workbook requires minimal technical expertise. Attaining a very high weighted mean of 4.92 revealed that the contents of the workbook can be easily viewed through its structured format. It infers that the workbook has an intuitive interface. The computed weighted mean of 4.92 denotes that users can navigate well in each part of the workbook. This means that users can seamlessly access and explore the targeted workbook components. The respondents confirmed that buttons and links are up to date which enable the user to be directed to the SF9, SF10 and SF2

template sheet. This was attested by the ratings of 4.92 given by the respondents. The design facilitates easy accessibility to the features of the workbook. There were also visual cues and directions that are easy to follow. Its weighted mean of 4.92 implies that the visual cues and directions offer a clear guide to ensure that the workbook is easy to use.

The macro-enabled workbook was rated highly for ease of use, with a mean score of 4.90 with standard deviation of 0.33, reflecting its user-friendly design and functionality. However, slightly lower ratings were observed when it came to using the workbook for automating school forms. This may be due to some respondents having only occasional experience with similar files or possessing basic Excel skills. Future studies could investigate whether users' Excel proficiency levels influence their ease-of-use ratings to help improve training and support materials.

Ease of access indicates a user-friendly interface that allowed the users to quickly learn and utilize the software. This contributed to the over-all efficiency of the app in assisting the users in completing the school forms. (Sumalinog & Lopez, 2024). This supports the results of the study that the macro-enabled workbook was easy to use due to its navigability aided by its structured format, up-to date buttons and links, easy to follow visual cues, guides and directions, and due to its structured format. However, it was worth considering that the slight variation in the ease-of-use ratings might be influenced by the respondents' level of Excel proficiency. While this factor was not directly analyzed in this study, future research could explore whether proficiency impacts how class advisers rate the workbook's ease of use.

### **3.4 Test of Differences in Class Advisers' Perceived Effectiveness of the Macro-Enabled Workbook Across Accuracy, Efficiency, and Ease of Use**

The table presents the results of the one-way repeated measures ANOVA analysis, which was used to assess the perceived effectiveness of the macro-enabled workbook across three areas: accuracy, efficiency, and ease of use.

**Table 4. Test of Differences in Class Advisers' Perceived Effectiveness of the Macro-Enabled Workbook Across Accuracy, Efficiency, and Ease of Use**

Anova: Single Factor

#### **SUMMARY**

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Mean</i>	<i>Variance</i>
Accuracy	120	598	4.983333	0.016527
Efficiency	120	598	4.983333	0.016527
Ease of Use	120	588	4.900000	0.107563

#### **ANOVA**

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	0.555556	2	0.277778	5.926295	0.002938	3.021012
Within Groups	16.73333	357	0.046872			
Total	17.28889	359				

A one-way ANOVA was used to evaluate the perceived effectiveness of the macro-enabled workbook in automating junior high school forms across three areas: accuracy, efficiency, and ease of use.



The results revealed that the mean scores for accuracy and efficiency were identical at 4.98, each with a variance of 0.0165, while ease of use had a slightly lower mean score of 4.90 and a higher variance of 0.1076. The analysis yielded an F-value of 5.93, which exceeds the critical F-value of 3.02 at a 0.05 significance level, with a p-value of 0.0029. These results confirm a statistically significant difference among the three variables, indicating that despite the close similarity in mean scores, class advisers perceived variations in the workbook's effectiveness across the areas.

### 3.5 Post Hoc Analysis of Independent Samples t-Test Comparing Accuracy and Efficiency to Ease of Use

Since a significant difference among the variables was determined, a post hoc analysis using Welch's test was performed to pinpoint the specific differences focusing particularly on ease of use. Considering the same mean for accuracy and efficiency, the test concentrated on comparing ease of use to accuracy and efficiency. This analysis provided further insights into the perceived differences in these aspects of the workbook's functionality.

**Table 5 Post Hoc Analysis of Independent Samples t-Test Comparing Accuracy and Efficiency to Ease of Use**

Comparison	Mean Difference	t-statistic	t-critical	p-value	Analysis
Accuracy vs. Ease of Use	0.08	1.76	1.975	0.080	Not Significant
Efficiency vs. Ease of Use	0.08	1.76	1.975	0.080	Not Significant

The ratings given by class advisers to determine the differences in accuracy vs. ease of use and efficiency vs. ease of use were analyzed. Although the mean difference between the two variables was 0.08 for both comparisons, the t-statistics of 1.76 were found to be lower than the critical t-value of 1.975. The p-values for both comparisons were 0.080, which is greater than the significance level of 0.05, indicating that the differences in ratings were not statistically significant.

This suggests that, despite small differences in their ratings, class advisers do not have a significant variance in evaluating accuracy, ease of use, and efficiency. The findings show no substantial difference in how they rate these variables. Therefore, it would be advisable to focus on enhancing the ease of use of the workbook, though the lack of statistical significance implies that these perceived differences are not as critical as initially expected.

### 3.6 ICT Experts' Evaluation of the Macro-enabled Workbook's Operational Characteristics in Terms of Functionality

The evaluation of the ICT expert on the Operational Characteristics of the Macro-enabled Workbook on automating junior high school forms in terms of functionality is shown in the table. For each indicator, number of respondents who agrees that the indicator was evident is presented.

**Table 6. ICT Experts' Evaluation of Macro-enabled Workbook's Operational Characteristics in terms of Functionality**

Operational Characteristic	EVIDENT	
	YES	NO
1. The macro-enabled workbook accurately automates the data entry process for SF2, SF9 and SF10, ensuring that all required fields are populated correctly.	3	0
2. The workbook's macros efficiently execute complex calculations and data manipulations, providing accurate results within a reasonable	3	0



processing time.

3. The macros in the workbook are well-documented with comments and annotations, allowing ICT experts to understand the logic and functionality of each script easily.	3	0
4. The automation scripts within the workbook effectively handle error conditions, such as invalid inputs or unexpected data formats, ensuring robustness and reliability.	3	0
5. The workbook's user interface is intuitive and user-friendly, guiding users through the automation process and providing clear instructions for operation.	2	1

Results showed that ICT experts agreed that all the indicative statements pertaining to the workbook's operational characteristics as to functionality were evident. They found the workbook to be very functional. This implies that the macro-enabled workbook accurately automates the data entry process for all the school forms generated. With regards to the workbook's macros, it was well-documented and efficiently executed. In addition, the displayed data were reliable since the automation scripts handle error conditions. As per the workbook's user interface, it is intuitive and user-friendly.

### ***3.7 ICT Experts' Evaluation of Macro-enabled Workbook's Operational Characteristics in terms of Compatibility***

The table showed the ICT expert's evaluation of the Operational Characteristics of the Macro-enabled Workbook, focusing on its compatibility with automating junior high school forms. It also shows the number of respondents who agreed that each indicator was evident.

**Table 7. ICT Experts' Evaluation of Macro-enabled Workbook's Operational Characteristics in terms of Compatibility**

<i>Operational Characteristic</i>	<i>EVIDENT</i>	
	<i>YES</i>	<i>NO</i>
1. The workbook works well on different versions of Excel.	3	0
2. The macros in the workbook work smoothly on both Windows and Mac computers.	3	0
3. The workbook has been tested to ensure it looks good and works properly on different screen sizes and resolutions.	2	1
4. The workbook's macros are designed to work alongside other common software add-ons.	2	1
5. The workbook has been extensively tested to make sure it can share data easily with other programs and systems.	3	0

ICT experts concurred that the developed system was highly compatible with other devices with diverse specifications and requirements. It was compatible with different excel version, office 2013 being the earliest version used. The macro-enabled workbook also works best with Windows and MAC operating systems. It also adjusted based on screen size and resolution. Likewise, the workbook operates alongside other software add-ons. Furthermore, data can be easily transferred and shared with other programs.

### 3.8 ICT Experts' Evaluation of Macro-enabled Workbook's Operational Characteristics in terms of Scalability

The table presents the ICT expert's evaluation of the Operational Characteristics of the Macro-enabled Workbook in terms of its scalability for automating junior high school forms. It includes the number of respondents who agreed that each indicator was evident.

**Table 8. ICT Experts' Evaluation of Macro-enabled Workbook's Operational Characteristics in terms of Scalability**

<i>Operational Characteristic</i>	<i>EVIDENT</i>	
	<i>YES</i>	<i>NO</i>
1. The workbook handles larger volumes of data for Sf2, SF9, and SF10 without experiencing slowdowns.	2	1
3. The macros continue to function effectively as data complexity increases.	3	0
4. The workbook utilizes resources efficiently, even with larger datasets.	3	0
5. Adding more features or adjusting to new rules for SF2, SF9 and SF10 forms is easy.	2	1

ICT experts agreed that the macro-enabled workbook is scalable. Based on trial, School Form 2 can accommodate 35 Male and 35 Female at maximum but can be further increased. Meanwhile, 500 learners can be accommodated for School Form 9 and School Form 10 and can still be amplified to handle larger volumes of data. Since it operates offline, it can be used by multiple users. Increased in the complexity of data did not impede the performance of macros. It continues to operate efficiently without experiencing slow down. However, users cannot add features nor adjust to new rules on the school forms since they are locked and hidden.

### 3.9 Class Advisers and ICT Experts' Suggestions and Actions Taken by the Developer to Improve the Macro-enabled Workbook

During the pilot testing and implementation in the LAC session, both class advisers and ICT experts provided suggestions for improving the workbook. These suggestions were addressed to enhance the accuracy of data, improve efficiency and time-saving features, and increase ease of use. The improvements made aimed to better meet user needs.

**Table 9. Class Advisers' Suggestions and Action Taken by the Developer to Improve the Macro-enabled Workbook**

<i>Feature</i>	<i>Potential Enhancement</i>	<i>Action Taken</i>
<b>Accuracy</b>	Enhance navigability to not lose track of names while grades are being encoded.	Suggestion was implemented.
	Use digital signature in SF10.	Adding e-signature is feasible, but approval for using it in SF10 is still pending.
<b>Efficiency</b>	Add minicard functionality for copy distribution and summary per quarter to monitor progress.	A separate sheet for minicards and quarterly summaries was added.
		Ranking function and color coding were

Feature	Potential Enhancement	Action Taken
<b>Ease of Use</b>	Add remarks and ranking functions for easy identification of students who need assistance.	implemented.
	Provide workbook instructions to guide the user.	Visual cues and brief instructions were embedded on the sheet.

The development of the macro-enabled workbook follows a continuous cycle of testing, feedback, and refinement. In the initial trial, the accuracy of the data in school forms was improved by ensuring that the names matched the grades of learners. This aligns with the findings in Table 1, where respondents strongly agreed on the accuracy of the data. The implementation of an e-signature for SF10 is pending formal endorsement.

The workbook's efficiency was enhanced with the addition of a minicard and quarterly summary, which saved time on data entry and cross-checking, as shown in Table 2. Additionally, the inclusion of remarks and ranking functions helped class advisers better monitor learners' progress. Visual cues and simple instructions were added to address users' feedback on ease of use.

Although the workbook was well-received, suggestions for improvement remain, particularly in terms of navigability, visual cues, and structure to enhance user-friendliness. Finally, further training, including video tutorials, is being developed to address the need for deeper user understanding.

**Table 10. ICT Experts' Feedback and Suggestions on the Macro-enabled Workbook for Automating Junior High School Forms**

Feature	Feedback and Suggestions
<b>Functionality</b>	Automate the workbook further by creating an online portal where subject teachers can input grades, and the adviser can download the data for printing.
	Enhance workbook security by introducing password protection, in addition to locked and hidden formulas.
	Consider adding an option for users to format the sheet to improve user-friendliness.
<b>Compatibility</b>	Expand compatibility beyond Windows and MAC by modifying the file type for access on mobile phones.
<b>Scalability</b>	Make the workbook accessible online to accommodate a larger number of learners

The feedback results confirmed that the macro-enabled workbook is functional, compatible, and scalable to some extent. However, ICT experts provided suggestions to further enhance its compatibility and scalability. Implementing these suggestions would require a complete redesign of the workbook, potentially compromising the macro-driven functions. These modifications go beyond the scope and limitations of this study. Since the primary objective of this research was to develop and evaluate a macro-enabled workbook, the researcher recommends that future studies focus on exploring alternative file formats and online applications for automating school forms that can be accessed via mobile phones.

#### 4. Summary of Findings, Conclusion and Recommendations

This study explored the effectiveness of a macro-enabled workbook in automating junior high school forms, focusing on class advisers' perceptions of accuracy, efficiency, and ease of use; ICT experts' views on its functionality, compatibility, and scalability; and potential enhancements based on feedback from both groups. This section focuses on the summary of findings, conclusions and recommendations of the current study.

#### 4.1 Summary of Findings

Based on the results, the class advisers' overall ratings on using macro-enabled workbook in automating junior high school forms in terms of accuracy was remarked as very high. The results implied that the macro-enabled workbook reflect accurate data with no errors in computation. Its attribute to save time was also remarked as very high. Thus, macro-enabled workbook was efficient in reducing the time spent on preparation of school forms, including data entry, formatting, importing records from various sources, and cross-checking. Users perceived the macro-enabled workbook to be easy to use. Although an excellent rating in ease of use was attained, operating the macro-enabled workbook in automating school forms noticeably garnered a slightly different rating from the respondents. **ANOVA** results showed that there is variation in perceptions of the workbook's effectiveness so the post-hoc analysis followed, revealing no significant differences between **accuracy**, **efficiency**, and **ease of use**. Although the comparison results showed no statistical difference and the mean was slightly lower than that of accuracy and efficiency, improving the workbook's ease of use would still be beneficial.

Results showed that ICT experts agreed the workbook's operational characteristics were functional. It revealed that the workbook accurately automates the data entry, macros were efficiently executed, and automation handled error conditions. As per the workbook's user interface, it was intuitive and user-friendly. ICT experts concurred that the developed system was highly compatible with other devices with diverse specifications and requirements. Data can be easily transferred and shared with other programs. They also agreed that the macro-enabled workbook was scalable to some extent.

Comments and suggestions given by the class advisers and ICT experts were taken into consideration since the current study aimed on improving the current process of preparing Junior High School forms. Class advisers' feedback was centered on the workbook's format to enhance navigability and make the workbook easy to use. They made recommendations to conduct a comprehensive training to aid teachers use the macro-enabled workbook with ease. Meanwhile, ICT experts' commented further improvements that can be made with the workbooks' functionality, compatibility and scalability constraints. But due to extensive structural and file format modifications require for online implementation and scalable user-access, these aspects were deemed beyond the study's parameter and was therefore recommended for future exploration.

#### 4.2 Conclusion

In conclusion, the macro-enabled workbook proved to be a highly effective tool in automating junior high school forms, commendable accuracy and efficiency, as perceived by both class advisers and ICT experts. While the workbook's ease of use was positively rated, slight improvements could enhance user experience. ICT experts affirmed the workbook's functionality, compatibility, and scalability, although further work is needed to address some limitations. The feedback from both class advisers and ICT experts provides valuable insights for future improvements, particularly the workbook's format and structural enhancements. As this study had demonstrated, the macro-enabled workbook was a promising solution for enhancing efficiency in school form preparation, with potential for further development to meet users needs.

#### 4.3 Recommendations

The following were hereby recommended by the researcher based on the result of this study:

1. To maximize the software's ease of use, a comprehensive training and support to teachers must be provided. This could include tutorials, user guides, and responsive support to address any issues promptly to ensure class advisers can easily use the tool.
2. It is recommended that the workbook be implemented with a larger group of class advisers to gather a broader range of ratings and more detailed insights. Additionally, evaluation by a larger group of ICT experts could offer a more comprehensive and reliable assessment of the macro-enabled workbook.

3. Future research should investigate on the effect of the excel proficiency level of the class advisers on their ratings as this factor could affect the workbook adoption and usage. This is to mitigate the risk of attributing any issues encountered in the workbook's design rather than lack of excel proficiency.
4. Further study focused on other file format and the use of various online applications to automate school forms which will allow it to be retrieved on mobile phones is highly encouraged.

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