Research Article

No IT Background? No Problem: Develop Your HRM Application Using Google Workspace

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Abstract

An organization can boost its human resource management performance by implementing digital technology. While such notion is widely acceptable, in practice, not all organizations can afford the technology. For small medium enterprises, digital technology for HRM can be costly. Neither having their own IT team nor outsourcing the project to a third party is within the budget for most SMEs. If there was any budget for digital technology, most SMEs would prefer the technology that can lower production costs and increase revenue. The author seeks a way to empower SMEs' HR people, who usually have no IT background, with Application Development Capability, thus increasing their productivity. This situation raises 2 questions: 1) Is there any possibility of developing a digital application for employees without IT background? 2) If such a thing is possible, will the non-IT HR employees be able to learn the method and implement it in their daily activities? The literature discusses how to empower people without IT background with application development capability being still scarce. This study reveals that free Google Workspace applications can be used to create a tailor-made application. When people fill in the google form and click the Submit button, the data can be automatically processed to meet our purpose and in a couple of minutes, if not faster, the report is automatically sent to the designated email address. The second finding makes it clear that, following this method, the non-IT HR employees are able to develop HR applications on their own.

Keywords*: empowerment, online application, google form, autocrat, performance, digital capabilities

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Introduction

Human Resource Management (HRM) involves many processes. In most of those processes, we need to collect data or information for evaluations and assessments. There are really a lot of things to evaluate. These tasks might even consume more time than the HR team members have to spare. Large and multinational companies usually have the budget to develop software or applications for HRM. However, small and medium enterprises (SMEs) do not have the same privilege. Developing new software from scratch is very costly. On the other hand, subscribing to existing services does not necessarily fit the company's needs nor budget. Such services usually develop applications based on what they consider the best practice in the industry. They have a lot of features, good features, but not necessarily needed by an SME. It does not make sense for the SME to pay for 1,000 features when it only needs 100. Creating an IT team is usually not an option for SMEs. Maintaining the team is considered costly. Furthermore, when making a small team, its process continuity risk will be very high, especially if its key members turn in their resignation. The project then can be discontinued or rebooted.

We are now left with HR staff and leaders without IT backgrounds. Most of them may not have the talents needed for coding. This situation raises the following questions, 1) Is there any possibility of developing a digital application for employees without IT background? 2) If such a thing is possible, will the non-IT HR employees be able to learn the method and implement it in their daily activities?

After a little research by reading blogs and viewing YouTube videos, the author finally found it. There is a process of automatically creating and emailing a webinar certificate to each participant after the participant fills a Google form. The Author believes that this process can be the foundation of developing applications for more complex processes.

In this study, the author selects the psychological test process, usually performed in a recruitment. In a recruitment process, to assure the job-person fit, the recruiter usually requires the applicants to come to the company where the interviews and the required assessments are conducted (Utami & Luthfi, 2018). The applicants are required to fill in many forms, including personal information and psychological assessments. Those forms are mostly still in the form of papers. However, in the digital era, the recruiters are now dealing with millennials and the digital natives. Most of them are reluctant to come to the company at an early stage of recruitment.

In the present days, applicants prefer a virtual recruitment process (Donald et al., 2023). It means submitting the application through job portals, emails, or social media applications. They also prefer online video meetings for interviews in the early stages. For these activities, the recruitment staffs can still easily follow the new behavior. They can even go further and have a virtual onboarding program (Yarbrough & Ramos Salazar, 2023). However, in terms of conducting a psychological test, like a personality assessment, it is still quite a challenge.

For some of the psychological assessments, the recruitment staff usually invite the applicants for a virtual meeting. In this meeting, they give a URL link for the questions. The link takes the applicants to the assessment application. That is the case for companies that already have developed the assessment application. For those who have not, the link will most likely take the applicants to a free data collection application like Google Form.

For SMEs, developing an online psychological assessment application is costly. Moreover, if the company uses many types of assessments, most of the applicants will resort to using Google Form to collect the data. The data will then be imported to another spreadsheet for the analysis. This two-step process is considered acceptable when compared to hiring other people to develop the application. However, the problem arises when there are too many applicants assessed at the same time. This two-step process can be exhausting and time consuming (Vu et al., 2020). A more automated and lower cost solution is needed.

The Author creates a solution for this problem by creating an application that requires minimal to no programming skills. In the next step, the Author needs to find a company who is willing to try the new application. The Author will then ask HR Staff in this company to evaluate the application. Hopefully, after acknowledging the benefits, they are more likely to learn how to make an application using the method proposed in this study.

DISC Personality Assessment tool will be used as an example in this study. This tool was selected

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because it is one of the most widely used (Utami et al., 2021). Furthermore, the data processing for this tool is more complex than some of the other personality assessment tools. The application prototype will show the DISC type of the applicants and a simple description of the type.

Literature Review

DISC Personality Assessment Tool

The DISC Personality Assessment tool was created by Dr. William Moulton Marston, a business consultant, and a psychologist in the 1920s. Marston's work was initially introduced in his book "Emotions of Normal People" published in 1928, where he proposed that human behavior could be categorized into four primary types: these are the D, I, S, and C factors which are dominance, influence, steadiness, and conscientiousness. These categories were meant to analyze the nature and intensity of people's reactions, and their response to various stimuli (Marston, 1928)

The DISC assessment has been quite popular for usage in the field of management and its subfields in areas such as team management, leadership training, and conflict management. Understanding the concept of DISC profiles makes it even easier for managers to align themselves with the specific behavioral patterns of their subordinates which will lead to a better working environment within an organization. For example, if a manager understands that a particular team member has a high score in Dominance, this can help the manager to assign him/her to complete complex tasks that require decisiveness and leadership, while an individual with Steadiness as one of the high indices will be most suitable for consistency and patience demanding tasks (McKenna et al., 2002).

A number of factors have pointed towards the conclusion that there is a significant positive relationship between the match between jobs and DISC profiles and the consequent effectiveness of the individual and the organization. For instance, Roh & Shin (2015) established that those employees in organizations whose job descriptions matched DISC types enjoyed better job satisfaction, less stress and higher productivity. This positivity not only boosts the physical, mental, and social health of the employees, but also shows organizational gains in the form of decreased turnover rates and improved social climate within the organizations (Beedu, 2021).

The most compelling studies confirming the utility of DISC assessment in organizational environment have been recently reported by the "Journal of Applied Psychology" in the form of a meta-analysis. In this research, data obtained from various sources and literatures were integrated and it was established that the implementation of DISC-based interventions positively influenced organizational efficiency rates, overall staff productivity and the satisfaction of customers (SO et al., 2020). These results signify methodological importance, implying that it is vital to supplement approaches to staff management with DISC assessments.

The DISC Personality Assessment tool created by Dr. William Moulton Marston has become a valuable tool in the contemporary world and has been widely used in management. Thus, the use of Person-Job (P-J) fit in matching jobs and people's behavioral patterns has been a subject to prove the effects on individual and organizational outcomes. Empirical evidence from scholarly sources including management psychology from the top journals proves the effectiveness of DISC assessment in organizing the workforce to improve performance and satisfaction.

Application Development Training for Non-IT Employees

Application development is still one of the digital skills rarely found among the non-IT employees, especially among Generation Z (Hermawan et al., 2023). Digital work environment demands that all workers in organizations regardless of whether they fall under the IT department should be able to create digital applications. Consequently, learning and development programs that address these skills should remain an organizational priority. Some research also indicates that enabling non-IT workers with fundamental app creation tools also helps to increase efficiency and workflow (McKendrick, 2017). It is advisable for companies to ensure their human resource management (HRM) employees undergo training in developing digital applications where there is a need to adopt solutions that software development cannot offer ready-made solutions. This can be more advantageous in increasing efficiency especially in areas that involve a lot of manual work such as data processing, enhancing the human resource department by creating tailored HR applications and interfaces.

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One of the challenges that arise during the process of training the non-IT HRM employees on the application of digital application development is choosing the right tools and methodology. Microsoft PowerApps, OutSystems and AppSheet are particularly suggested because they are easy to navigate with and there are many resources available online concerning their use. Such apps enable employees who may not have much experience in coding to build useful applications using snap-and-drop interface, as well as application blueprints. If these tools are utilized, it will ease the learning process for the personnel of the HRM since they will not be faced with the complexities that are associated with conventional programming languages, thus enhancing the easy and faster deployment of the applications.

However, there are certain problems that counterbalance the prospects of training non-IT employees to create digital applications. A major one is change resistance and the uptake of the new technology by employees who are used to old-fashioned methods (Limaj et al., 2020). Further, it can become quite a challenge to grasp the logic found in application development, even if the tools are as simple as using a form. To reduce these risks, the companies should ensure the support and encouragement is always provided, supplemented by organizational culture, which encourages innovation and learning.

The role which top management has for these training initiatives is outstanding. It is widely known that the influence of change leadership to firm performance is positively mediated by knowledge acquisition (Lukito et al., 2023). Therefore, learning and training should be fully supported by top management, and they, themselves, should attend the programs as the ultimate key to the concept of digitalization (Shao et al., 2024). The management should provide adequate time and money for the implementation of the training together with laid-down objectives and means of evaluating the effectiveness of the training. Furthermore, an atmosphere where one can share experience and solutions among employees is a great improvement that can additionally help on the learning process and achieve the results.

To some extent, many works proved the need and the advantages of the introduction of digital application development training to non-IT personnel. For instance, Raza et al. (2017) have done a study where organizational investment on such training enhances organizational operation efficiency and employees' satisfaction levels. In another paper, Bogdanoska Jovanovska & Ratkovic (2014) identified the result that the firms that provided the strong learning and development function for the digital skills revealed higher innovation and more suitable ways to respond to the change request in the market. However, such an achievement is only possible if the trainees trust and perceive learning and development as being beneficial for them (Susilo et al., 2021).

Google Workspace Applications & Features

Google Forms

Google Form is one of many free online tools in Google's Workspace. It is currently the most popular application to administer surveys. In the Human Resources Management field, Google forms are mainly used to collect data. They are mostly used for collecting applicants' profiles in a recruitment process. In a training and development activity, Google Forms are used for conducting pre-test, post-test, and evaluation (Ampo et al., 2023).

In the era of webinars and online workshops, many use Google Forms to create an attendance list. Some virtual event organizers create participation certificates based on that list and email them manually. Some others automated the whole process. The participants only need to fill the attendance form in a Google Form. The certificates will be automatically sent to their emails just a few minutes after they submit the form. This automated process inspires the author to develop an online personality assessment application based on Google Workspace Applications.

Google Sheets (Response Sheet)

Google Sheets is an online spreadsheet application provided by Google Workspace. When people want to import the data collected using Google Form, they usually create a response sheet first. The response sheet file type is Google Sheet. As a spreadsheet application, it is possible to write a formula or functions in a cell within the response sheet. After the data collection period, people can just use the response sheet like an ordinary spreadsheet. If the form collects new data, the user only needs to manually copy and paste the formula and functions to the new row. However, there is still a big problem if people want to have the formula and functions automatically appear on the same row of the new data submitted from Google Form.

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When working with spreadsheets, it is a common practice to copy and paste the formula and functions to tens or even hundreds of rows below. It is usually done to make the required output shows the real time information at the same time new data are typed in. Unfortunately, although this practice can still be done in Google Sheets, it cannot accommodate new data entries in the response sheet which are sent by Google Form.

Whenever someone submits a form, the data are sent by Google Form to the response sheet. The response sheet then creates a new row. The new data were then added to the new row. Since the row is new, there is no pre-written formula or functions in it. The previously written formula or functions are shifted down after the new row. For example, currently, there are 10 applicants who have submitted their assessment. It means there are 10 rows of data in the response sheet. The recruitment staff then write formula and functions in several cells on the first row. The staff then copy and paste them up to the 10th row and the results are as expected. The formula and function then copied and pasted up to the 15th row making them ready while waiting for the new data. This is the tricky part. When another applicant submits the form, the response sheet will insert a new row after the previous data. It means now there is a new 11th row and the previously written formula and functions in rows 11 to 15 are now shifted to row 12 to 16. There is no pre-written formula and function in the new row 11. When the new data are added to row 11, there is no cell that contains formula or function to perform the analysis. Without an analysis, the assessment cannot be automated. In this kind of situation, it is better to use ArrayFormula.

Array Formula

The ArrayFormula is a function in Google Sheets. It applies a single formula to every cell in the data range which is previously defined. By converting the original formula into an array, the method enables users to create a single formula that may be used across several rows. By converting the original formula into an array, the method enables users to create a single formula that may be used across several rows.

The use of ArrayFormula is ideal for the challenges found previously. Using ArrayFormula, people can write the formula or functions needed for data analysis in cells on the first row. Whenever new data are sent by Google Form to the response sheet, they will be placed below the previous data. They will be included in

the array as defined by the ArrayFormula. Thus, the data analysis will also be performed at the new row.

Google Slides

Google Slides is an online tool for creating and formatting presentations that you can collaborate on with others. This application is free to use as an application within Google Workspace. In this paper, Google slide is used to create a template of the report of the personality assessment. People can create layout here while adding some pictures. The analysis result from the response sheet can be connected to the template by using an add-on application called AutoCrat. The cell value in the response sheet can be linked to the layout by placing the column name in the middle of "<<" and ">>".

Auto Crat

With the help of the Google Sheets add-on AutoCrat, users can merge data from their spreadsheets into various formats, such as PDFs. In this paper, AutoCrat is used to merge the analysis results created in the response sheet into the template in the Google Slides file. A PDF file will then be created and sent to the predefined recipients. These recipients can either include the applicants or not.

Up to this point, the Author believes that Google Workspace environment provides a possibility for non-IT HR staff to develop HR applications.

> H1: *Google Workspace applications enable a way to make a tailor-made HR application without the need of having an IT background.*

Nowadays, most employees are familiar with Google Spreadsheet, Google form, and Google Slides. Google Spreadsheet and Microsoft Excel have many similar functions. Therefore, learning how to create applications using Google Workspace applications is not an impossible task.

> H2: *Empowering non-IT HR Staff with application development capabilities is possible.*

Research Design and Methodology

This research follows the following steps:

1. Find a company that uses DISC in their recruitment process.

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2. Develop the DISC application. The statements used in the application and the formula for calculating the applicants DISC type refer to the ones usually used by the company.
3. Ask the HR staff to use the new DISC application.
4. Interview the HR staff to learn how much they like or dislike the application and whether it increases their performance. The Author also needs to find out whether they are interested in learning how to make their own applications.
5. Give training to the HR staff.
6. Evaluate their ability in developing HR applications using the newly learned method.

Fig. 1 shows the flowchart of the development of the online DISC personality assessment application using Google Workspace applications.

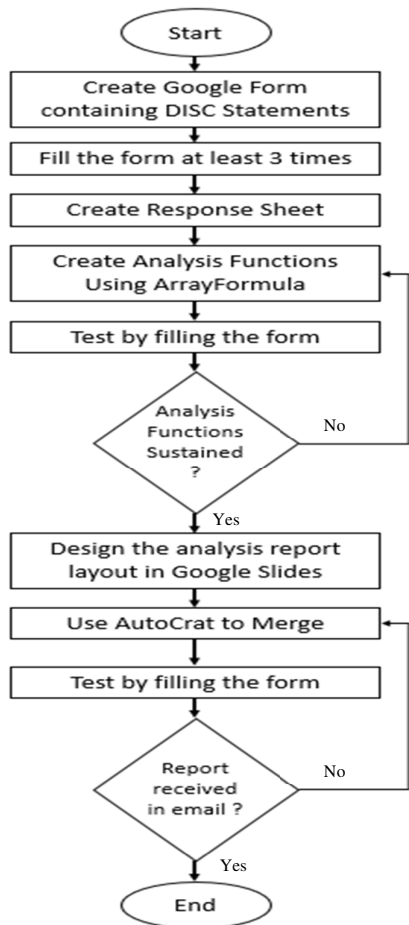### Creating the Form

The first thing to do was to create the form. In the DISC personality assessment tool, usually for each number, people are given 4 statements and required to choose which among the 4 statements that the most like them and which one is the least like them as shown in Fig. 2. Unfortunately, Google Form does not provide an option for such type of questions. Each question has to be separated into 2 questions. One will have the "most like you" question, and the other will have the "least like you" question.

The "most like you" questions are given additional code "A", while the "least like you" questions are given code "B". The first original question will have 2 numbers now, "1A" and "1B" as seen in Fig. 3. These numbers will make it easier to look for the data when developing the ArrayFormula. The 4 statements are also given their own code, A, B, C, and D. These codes will be used for data processing.

Fig. 1. Application Development Flowchart

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	M			L
	a	Easygoing, friendly, easy to agree		a
	b	Trusting, trust other people		b
	c	Adventurer, Risk taker		c
	d	Tolerant, Respect others		d

Fig 2. Sample of DISC Paper Assessment

1A Which one of the following is the MOST like you? *

◯ A. Easygoing, friendly, fun

◯ B. Full of trust, trust in others

◯ C. Adventurer, risk taker

◯ D. Tolerant, respectful

1B Which one of the following is the LEAST like you? *

◯ A. Easygoing, friendly, fun

◯ B. Full of trust, trust in others

◯ C. Adventurer, risk taker

◯ D. Tolerant, respectful

Fig. 3. How DISC assessment statements are placed in Google Form

Fill the Form

A sufficient amount of data is needed to make sure that the ArrayFormula is written correctly. The ArrayFormula is usually written on the header of the column (Row 1) or on the same row with the first data (Row 2). One datum is not enough because the author also needs to check whether the autofill function is working. To be on the safe side, at least 3 rows of data are required. After the form is ready, the author randomly fills the form 3 times in order to get different results.

Create Response Sheet and Data Processing Functions

The response sheet was then created, and data processing can be started. The main goal of this process is to create a report based on the subject's DISC profile type. To reach that goal, the following steps were followed:

- Use the assessment answer key to convert the answer to every question to its corresponding DISC type.
- Count how many times each type of DISC is given as an answer by the subject.
- Do the 2 steps above for both "most like you" and "least like you" questions.
- The "most like you" DISC score will be used as the Public Self profile. The "least like you" DISC score will be used as the Private Self profile.
- To obtain the Perceived Self profile data, the score of the Public Self Profile is subtracted by the score of Private Self Profile.
- Up to this point, the DISC score data have already been identified. These data can be used to chart a graph manually. However, since the purpose of this study is to create an online application for personality test, the current output is still not enough. The application needs to be able to tell the DISC type of the subject. In order to be able to do that, a sorting function is

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needed. This function will make it possible to tell whether the subject has a high D, high C, mixed IS, etc.

- A ranged table was created containing description text for all possible outcomes.
- An ArrayFormula with VLOOKUP function was added to the response sheet. It links the DISC type as the result of data processing with its corresponding traits description.
- Another form was filled to see whether all of the functions in the responses' sheet worked automatically.

Up to this point, the hard part is mostly done. It is time to move to the next step.

Design the Report

The report layout should be ready in the form of a Google Slide file. It is possible to design the layout using other software like Microsoft PowerPoint, however, in the end, it needs to be converted to a Google Slide file. It would be better to save the file in Google Drive using the same account as the Google Form and Google Spreadsheet files that have been prepared earlier.

More than one slide can be used for the report. Tags were created using text boxes. Users only need to type <<Full Name>> in the text box and place the text box wherever they want; the data under the "Full Name" column appear after the google slide is merged with the response sheet.

Create the Autocrat Function

The AutoCrat add-on can be found in the Extension Tab of the response sheet. If it cannot be found, one must get it first and install the add-on. When working with AutoCrat, the following importing steps were taken:

- Selecting the report template file. This is the Google Slide file prepared in Step D.
- Pairing every tag in the template to specific data in the response sheet.
- Setting the email address of the recipient of the report. The email address can be a fixed one, which means every result will be emailed to that address. Tags can also be used so that the email containing the report file can be sent directly to whomever fills the Google Form. It can also be both, using tags and fixed email addresses.

- The AutoCrat was run to evaluate the report file.
- The Google Form was filled in again to see if it is automatically sent to the correct email address.

Result and Discussion

A manufacturing company was willing to participate in this research. Following the law of The Republic of Indonesia number 20/2008 about micro, small, and medium enterprises, the company falls within the category of medium-sized company. PT. Citra Packaging Industry is a manufacturing company in Central Java Province in Indonesia. It produces plastic bottles for packaging. Having annual revenues around USD 2 Million, it serves small and medium enterprises in Indonesia with active customers around 2,000 businesses. They are mostly in beverages and agriculture-related industry. Currently, the company is too small in terms of market share when compared to the other companies producing the same products. Founded in 2007 with just 5 employees, currently it employs around 200 people. The company is already professionally managed. The CEO has no family and kinship relationships with the founder of the business.

The company uses DISC personality assessment tool along with some other assessment tools in its recruitment process. The HR staff usually send an Excel file containing statements for DISC analysis. The candidates fill their answer in the spreadsheet and send their answer back to the HR staff. The HR staff then copy and paste their answers to another excel file that contains formulas. Then the results are copied and pasted to the report sheet. Their method is actually already quite simple.

The Author copied the files containing question sheet and formula sheet and developed the application. The online DISC Personality Assessment application was successfully developed. Fig. 4 shows the DISC assessment report prototype developed in this study. The link to the Google Form will be placed at the end of this section. Readers are welcome to try and fill in the form and wait a few minutes before the result reaches your email. It was developed using only the free applications in Google Workspace such as Google Forms, Google Sheets, and Google Slides. It opens the possibilities to using these free applications to create new simple but useful applications. Thus, *H1 is supported*.

The main challenge in developing the application was the use of ArrayFormula. Commonly used functions in spreadsheets like COUNTIF(),

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SUMIF(), MAX(), MIN(), and many more cannot be used as usual. Even simple logical functions like AND() and OR() become quite a challenge. The author has absolutely no background in programming. Overcoming such a challenge was not easy. However, there are many resources out there that can be used to overcome the problems.

All over the Internet, there are people helping other people with similar problems. Although the problems are not exactly the same, but, after giving some thought, some of the ideas can be applied to solve the problems at hand. The ideas from these people are more helpful than the artificial intelligence generated formula. The Author had tried looking for some solutions from ChatGPT and Claude, however, it was not fruitful. The answers given by them only go in circles and do not bring the author any closer to the solution.

If there is no lead on the Internet, those functions can always be substituted by more basic functions that take longer routes. Nevertheless, despite the challenges, the application can be developed in a relatively fast time. It only takes a couple of days even though the author knows nothing about programming.
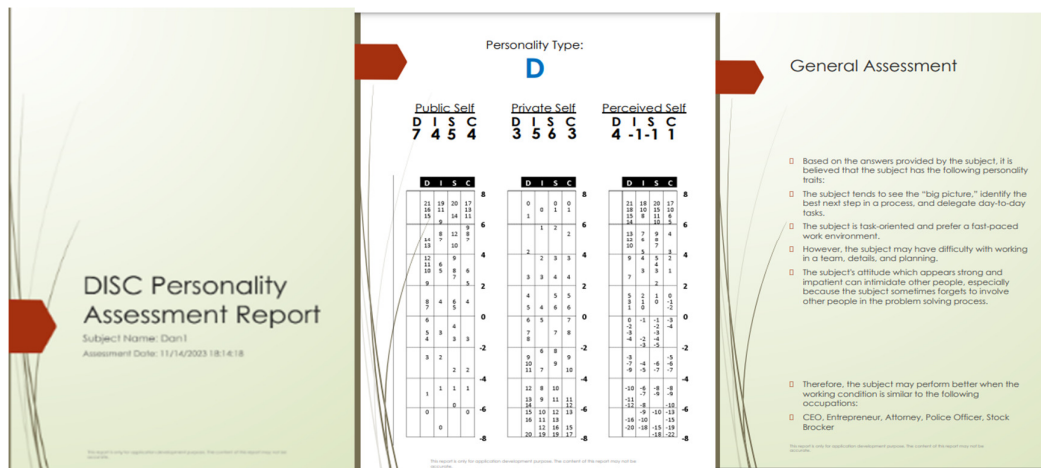

Fig. 4. DISC Assessment Report

The Author asked the HR staff to try the applications. There were 3 people involved, the HR Manager and 2 recruitment staff. Initially, they asked 10 recruitment candidates to use the application. Then, they compared the results with their previous method. They manually typed the answers from the response sheet of the application to the excel file that contains the formula. The results are the same. It provides evidence that the application's result is reliable. In one month, the application was used 104 times.

In the interview, the HR staff give the following statements:
- The application is reliable.
- Using the application enables them to save a lot of time and speed up the recruitment process.
- They are eager to learn about how to make applications using the Author's method.

The training was conducted. It takes 2 days to complete. On the first day, they learn about Google Workspace applications and features, including autocrat extension and ArrayFormula. How to combine them into one application system was relatively easy to understand. A large part of the time was to get familiar with the ArrayFormula, and how to search for solutions for ArrayFormula that requires more complex functions. On the second day, the author conducts an assessment. The HR staff each tried to develop HR applications using the method they had learned so far. They have successfully created applications such as, application to distribute minutes of meeting, application that enables an employee to access their own performance evaluation, and applications for suggestions and whistleblower reports to be delivered to many people in top management at once. These new applications prove that the training was successful. The HR staff now have the capability to develop HR applications even without IT background. Thus, *H2 is supported*.

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Study Limitations

This study is limited by the author's minimum knowledge and experience in ArrayFormula. Familiarity with how spreadsheet functions should be written in ArrayFormula may drive up the efficiency of the application development process. The vast potential of what kind of applications could be developed by integrating Google Workspace applications should be explored in future studies. Future studies should also try to use this method for developing more complex applications such as accounting applications, or even a simple ERP application.

Conclusion

The need to have a low-cost online personality assessment tool for company recruitment has found a solution. This study has shown that by combining 3 Google Workspace applications, a new application can be developed. The link to try the application prototype is already given in the previous segment.

The HR staff have already used the application 247 times when the Author wrote this paper. It shows the potential of cost saving for the company if the recruitment staff are willing to learn a little more about ArrayFormula. A personality assessment application is just a start. There should be a lot more applications that can be developed using the Google Workspace. The beauty of it is that it does not require advanced programming capability.

Besides the low cost, the application developed using the free Google Workspace applications is easy to use. Most people currently have a smartphone. Nowadays, the ways people use Google Forms are plentiful. People are becoming more and more familiar with it. In the office, the use of Google Forms, Google Slides, and Google Sheets is getting more common. This condition enables the office staff to shorten the learning cycle despite the obvious challenges of mastering the ArrayFormula. It is proven by the Author. The training was effectively only needed one day. The second day was already for assessment purposes.

Acknowledgment

The author is grateful to the company participating in this research.

Notes

- Due to privacy issues, the company name mentioned in this paper is not the actual name. However, the other information about the company is true.
- Application prototype link: https://forms.gle/VvBnLwuW1ELa7ken6

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