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# DocuValet – Systematic Management of Documents: Using Design and Development Research Process

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**Abstract:** *The emergence of digitized world and onset of the unprecedented pandemic beginning of 2020, the management of office-based tasks have gradually been executed online. For the purpose of this study, it is focussing on developing a prototype that facilitates the documentation of evidence for the Training Management System established by the Ministry of Education, Malaysia which was normally prepared in hardcopy for submission by all staff at the stipulated case for this study. This paper describes the development of a Google Sites-based prototype dubbed as DocuValet which incorporates the methods and approaches of the Design and Development Research (DDR) particularly oriented on product development procedures. The effort in generating this prototype involved designing, developing, and integrating functions of relevant websites, folders, Excel as well as Word documents necessary to facilitate the efficient documentation for continuous professional development activities of all staff at this stipulated case. These research procedures employed are following the tenets of Instructional Systems Design (ISD) which are put into perspective using ADDIE (Analysis, Design, Development, Implementation and Evaluation) Model. This is a case study where qualitative data is collected through interviews, observations, and trial runs through introspection and retrospection processes. Various types of data are to be gathered namely profile data, context data, progress project data and try-out data. It is hoped the outcomes of the analysis may solidify the production of this prototype and provide intended benefits for all users of this product not only at the stipulated case but also other institutions which are adopting the similar Training Management System.*

**Keywords:** DocuValet, Google Sites-based prototype, instructional systems design (ISD), ADDIE Model

## 1. Introduction

In line with the essence delineated in Shift 4 of our Malaysia Education Blueprint 2013 – 2025 where upgrading the quality of continuous professional development is one of the aspects, our Ministry of Education, Malaysia has geared up the effort to plan human resources development programs based on competency and continuous professional development to equip all staff under the ministry with the right attitude, skills and knowledge (ASK) to execute their designated tasks and job well (KPM, 2020).

In relation to the requirement delineated above, a Training Management System has been established and is in place to support the implementation as well as documentation and monitoring of continuous professional development activities undertaken by our staff (KPM, 2020).

The 13 aspects of professional development delineated in the Training Management System are namely:

i. Course/ workshop/ seminar/ colloquium/ convention/ symposium/ forum/ conference/ counselling clinic
ii. eLearning
iii. Innovation
iv. Professional Learning Community (PLC)
v. Benchmarking
vi. Reading
vii. Academic advancement
viii. Writing
ix. Research
x. Attachment program
xi. Contributions
xii. Webinars
xiii. Briefing/ Professional Talk/ Academic Sharing/ Dialogue session

All the aspects must be substantiated for endorsement purposes. The case of this study too is complying to the required procedures and the outcome of the analysis is to be reported systematically. This responsibility has fallen hard on the shoulder of the coordinator of the Training Management System. Some of the major responsibilities are:

i. To ensure all the basic information of all staff is consistently updated,
ii. To ensure all training records of all staff are well-documented, the list of participants and status of participation are updated in the system,
iii. To spread and promote the use of system to all staff in the organisation,
iv. To check the supporting documents and endorse all the 13 aspects of professional development activities registered by all staff in the system.

These responsibilities get tougher and more challenging when issues/problems depicted in the next section arisen.

## 2. The Issues/Problems

All executions of activities in relation to the 13 aspects in the Training Management System can only be endorsed when they are well supported with evidence be it memos, letters, certificates or reports. This starts to pose challenges to the coordinator in charge of managing the record of all professional development activities for all the staff in this stipulated case.

When the activities registered in the system are not substantiated, the coordinator has to follow up on each of the related staff for evidence. This has truly taken a toll on the coordinator especially in terms of time and energy. The delay in the endorsement process may suspend the analysis of the staff professional development progress twice a month.

Until the year 2019, different types of evidence are submitted in the form of hardcopy. If this goes on for the next couple of year, the files which are used to document these evidences will get too extensive, and the case in the study may face the problem of space availability when all the documents are archived for safe-keeping.

In 2020, the whole world was suddenly plagued by the Covid-19 pandemic which has forced most of us to be house-bound and work from home instead. Hence, the prospect of obtaining the manual documents/evidence from the staff was hampered.

Due to the onset of the unprecedented Covid-19 pandemic, the needs below came into picture:

i. Ease of documentation,
ii. Ease of access,
iii. Ease of uploading, and
iv. Ease of retrieval.

All in one platform. The platform which is dubbed as DocuValet was initiated.

## 3. Literature Review

### 3.1 Product Development Approach in Design and Development Research

This paper is crafted using the Product Development Approach in Design and Development Research which is defined comprehensively by Seels and Richey (1994) as "the systematic study of designing, developing and evaluating instructional programs, processes and products that must meet the criteria of internal consistency and effectiveness" (p. 127). The definition is in line with the situation in which the research team of this study is performing involving instructional design, development, and evaluation processes and at the same time, studying the process.

For this study, it is generally adopting Type 1 Developmental Research which, according to Richey, Klein and Nelson (2016) is the most context-specific inquiry and examines the:

i. type of program or product developed,
ii. particular design, development, or evaluation process emphasized in the study,
iii. particular tools and techniques emphasized, and
iv. organizational context for which the product is intended. (p. 1104)

### 3.2 Guiding Concepts and Framework of the Study

This study originates with the design and development of an instructional product entitled DocuValet which generally entails documentation of the entire design, development and evaluation process in producing DocuValet. The procedures employed are following the tenets of Instructional Systems Design (ISD) encompassing front-end analysis through evaluation (Richey & Klein, 2007). Detailed description of the tenets is put forth in the section on Research Methodology in this paper.

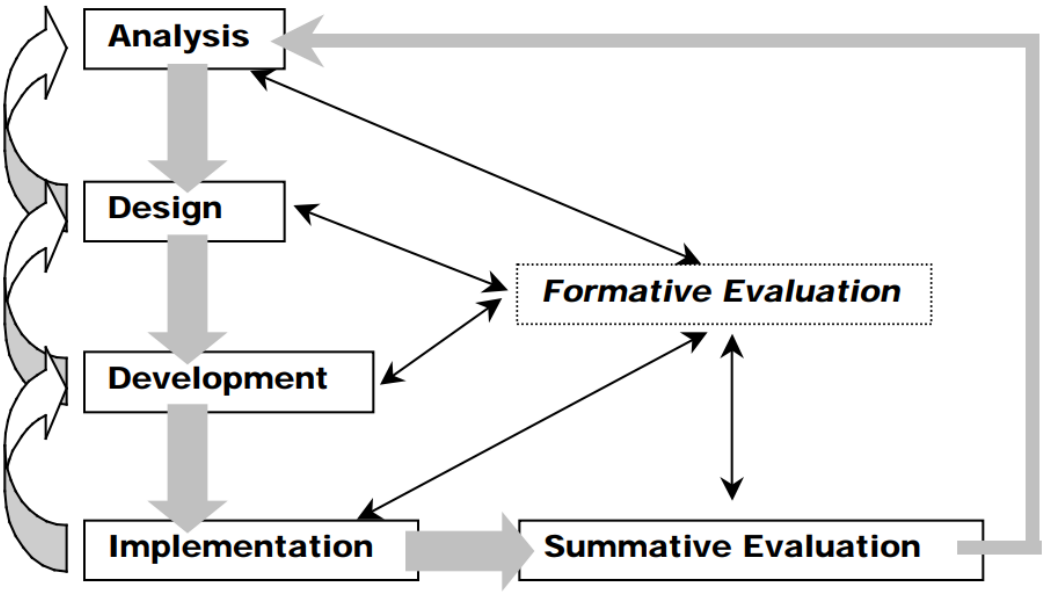


**Figure 1: ADDIE Model: Instructional System Design (ISD) (McGriff, 2000)**

In order to put the Instructional Systems Design (ISD) into smooth procedural perspective, the ADDIE Model, as depicted in Figure 1 is utilised as the underlying instructional design process for it fits the design and development methods, objectives and approaches to portray a complete picture and understanding in building the prototype intended in this study. This model is expanded and delineated in detail in Figure 3 in the section on Findings of the Study, once the development procedures have been clearly defined and integrated onto the ADDIE Model.

### 3.3 Google Sites-Based Project

In the study, the Google Sites based platform is used to develop the prototype, DocuValet. Google Sites is an easy, yet surprisingly powerful tool to build functional hub for group projects, tasks, as well as compilation of eportfolios and documents. Nowadays, Google Sites has been employed to design and structure to emulate the appearance of a "real website" (Betcher, 2021). Google Sites is the choice as it fulfils the characteristics of the design required to build this prototype by platform designer. The characteristics involved are namely:

i. Consistent
ii. Well-organized
iii. Easy to use
iv. Accessible to a variety of users
v. Interactive with useful content
vi. Visually appealing

These six aspects are important considerations in creating effective website design proposed by UW TRIO Training (2011).

## 4. Objective of the Study

The main purpose of this study is to describe the development of a Google Sites-based prototype dubbed as DocuValet which incorporates the methods and approaches of the Design and Development Research (DDR) particularly oriented on product development procedures. The effort in generating this prototype involves designing, developing, and integrating

functions of relevant websites, folders, Excel as well as Word documents necessary to facilitate the efficient documentation for continuous professional development activities under the Training Management System for all staff at this stipulated case.

The main objectives of this study are to describe the:

i. analysis processes conducted in developing the prototype.
ii. intended designing processes involved in developing the prototype.
iii. developmental processes involved in developing the prototype.
iv. implementation processes executed in developing the prototype.
v. evaluation processes undertaken in developing and refining the prototype.

The objectives of this study help to generate the research questions of this study:

Research Question 1:
What are the analysis processes conducted in developing the prototype?

Research Question 2:
What are the intended designing processes involved in developing the prototype?

Research Question 3:
What are the developmental processes involved in developing the prototype?

Research Question 4:
How are the implementation processes executed in developing the prototype?

Research Question 5:
How are the evaluation processes undertaken in developing and refining the prototype?

## 5. Participants and Case of the Study

For the initial stage of the development of DocuValet, the participants are consisted of the coordinator of the Training Management System, designers and developers of the prototype as well as all the staff as users of the prototype at this institution which is the stipulated case of this study.

## 6. Research Methodology of the Study

This study is generally adopting the Design and Development Research (DDR) procedures. DDR procedures are based on the concept that the practice of design and development is empirical by nature (Richey & Klein, 2007) which accentuates scientific problem-solving processes. It develops innovative interventions (also referred to as Intervention Design and Development) to provide possible solutions to practical problems (Thomas & Rothman, 1994). According to Richey and Klein (2007), design and development process enables product developers to undergo scientific methods that help in supporting the understanding of the whole designing and developing process. Hence, it matches the needs and processes of this study.

Richey and Klein (2007) identify three main categories of Design and Development Research Project:

i. Research on Product and Tool,
ii. Product Development Research, and
iii. Validation of a Model Research.

The category that is in line with the flow of ideas and developmental process of this study is Product Development Research. Product Development Research can be conducted during the design of a product or tool. When conducting such a project the entire design and development process is documented. The procedures employed during design and development follow the tenets of instructional systems design (ISD) listed below manifested by Dick, Carey and Carey (2009) which made up of:

i. Front-end analysis. At this stage, needs analysis, goal analysis, instructional analysis (content analysis & task analysis) as well as user and context analysis are conducted.

ii. Design. At this stage, writing of performance objectives, identifying, determining and developing instructional strategies are carried out.

iii. Development. At this stage, creating the intended story board and developing or adopting instructional materials (images, presentations, video clips, multimedia materials, web pages, etc.) are executed to build the prototype.

iv. Implementation and evaluation. At this stage, implementation and formative evaluation will be conducted.

v. Revision. At this stage, the data gathered through formative evaluation are utilised to refine and re-examine the appropriateness of the prototype.

vi. Impact/Summative Evaluation. At this stage, the value of instruction and its effectiveness are determined.

### 6.1 Methods and Data Collection Strategies

The paper which is emancipated from a bigger Design and Development Research Project adopting the descriptive case study approach which provides a detailed description of the design and development process in building DocuValet, an application to systematic management of documents and information using free resources from the internet. These procedures flow from its initial step to the final step of trying out and evaluation of the prototype.

Richey and Klein (2007) suggest that the types of data supporting DDR are as follow:

i. Profile data. This data is gathered from people who are involved in the project namely designers and developers, design team, and clients (users) as well as the actual project itself (scope, resources, and the nature of the product to be developed).

ii. Context data. This data is collected from 3 different environment namely (1) the environment in which the design and development takes place, (2) the environment in which the intervention is executed, and (3) the performance environment where the skills and knowledge of the design and development processes are utilised.
iii. Progress project data. This data is collected as the design and development is progressing. Some of the data collection strategies may include logs; tasks completed;

time-on-task; decision made; designers' and developers' difficulties and challenges; designers and developers' opinion about the ID process; users' attitudes; and subject matter experts views and recommendations.

iv. Try-out data. This data makes up product evaluation data from users, designers and developers collected using various instruments in the form of work log, interview protocols and observation guides (Dick, Carey & Carey, 2009).

All types of data as illustrated above are determined in order to ascertain more contextualised production for the consumption of the users at the stipulated case in this study. These data are captured using the Observation Guide and Interview protocol attached as *Attachment A* and *Attachment B* respectively.

## 6.2 Data Analysis

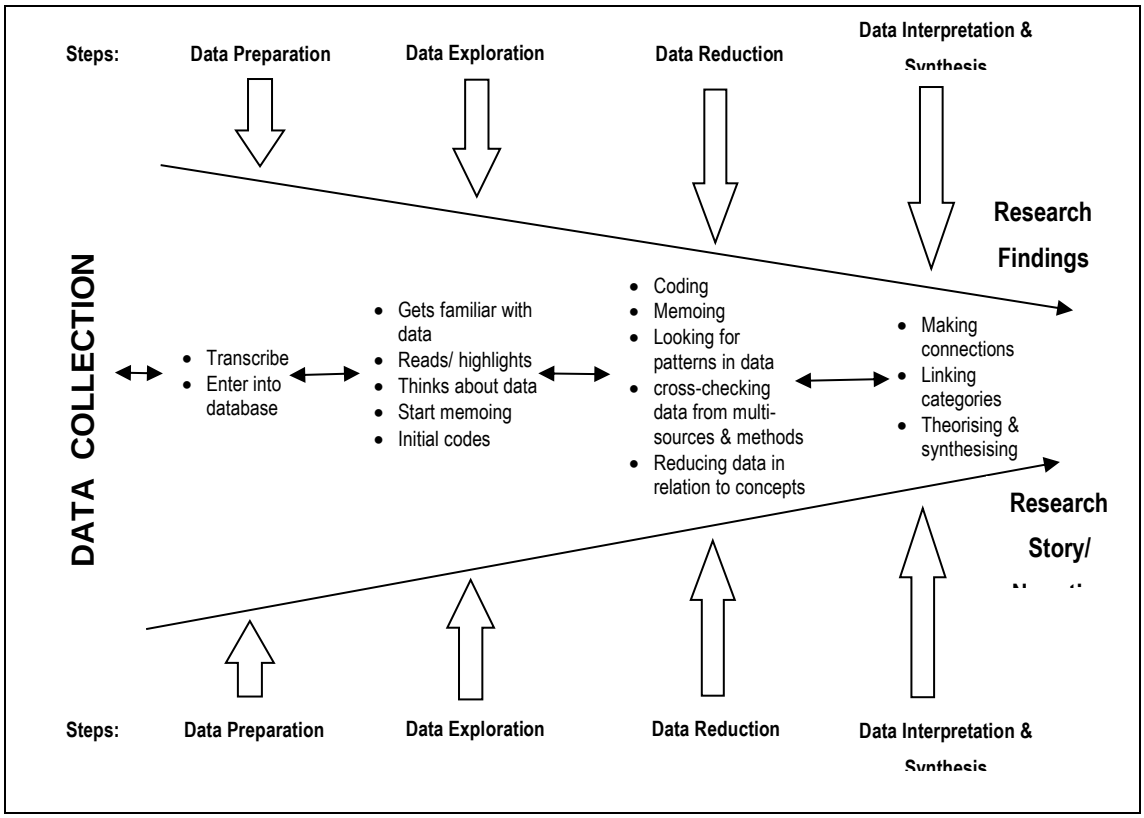


**Figure 2: Steps in Data analysis and Interpretation: A Visual Model. Adapted from S. N. Hesse-Biber and P. Leavy, 2006, *The Practice of Qualitative Research*, p. 358.**

For data analysis process, it follows the procedures popularized by Hesse-Biber and Leavy (2006) which involves Data Preparation, Data Exploration, Data Reduction, and Data Synthesis as depicted in Figure 2. The process of interpretative analysis starts with coding process of the raw data in relation to the data collection guide and protocol of this study. All relevant information from the multiple sources of data collected is decontextualized and recontextualized in relation to the variables manifested under the conceptual framework and the research questions. This subsequently facilitates the "teasing out" of various knowledge claims in relation to the objectives of the study.

## 7. Findings of the Study

Before revisiting the research questions for detailed delineation of the findings for this study, refinement of the Product Development Process framework based on the Instructional System Design using the ADDIE Model (Figure 1) has been executed to path way for systematic and justifiable construction of the product. The reestablishment of the Product Development Process framework for this study is depicted in Figure 3.

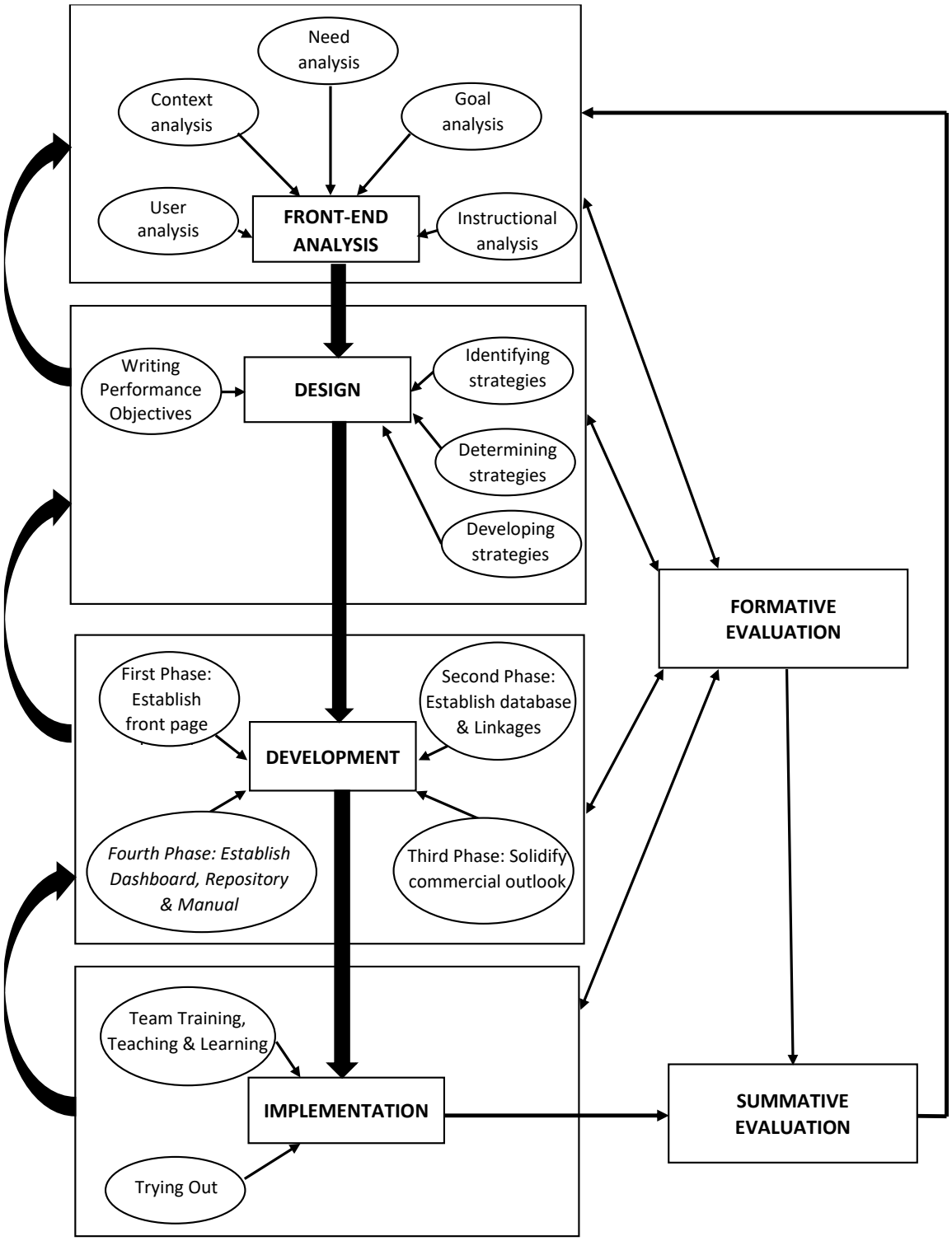


**Figure 3: Product Development Process for DocuValet**

As rationalised by Dick, Carey and Carey (2009), front-end analysis facilitates the researchers at this stipulated case in realising the impact of the product as well as the production processes without "navigating a maze of literature" and decide how, where and what to begin in determining the type of product needed. At times, due to the urgency of an organisation or institution to deliver a required product, the outcomes of the front-end analysis may provide the immediate scenarios for the researchers to draft the required specifications of the product fast. With the analysis too, it helps the researchers to focus on the relevant literature for better referencing and support.

Presented below is the essence of the outcomes based on the analysis:

### 7.1 Front-end analysis

Front-end analysis carried out at this case involves goal analysis, need analysis, instructional analysis, user as well as context analysis. The summary of the data collected is put forth below.

i. Goal analysis – The building of DocuValet is driven in accordance with:
   a. User complaints
   b. The needs to comply to the requirement of Public Sector Conducive Ecosystem - EKSA
   c. Uphold the latest trend in executing the official duties and responsibilities
   d. The Charter (*Piagam Pelanggan*) of the case – to ensure that consumers' needs, and interest are the utmost priority
   e. The directive from the management to overcome the issue

ii. Need analysis – The following needs and aspects are extracted from the users:
   a. Ease of documentation
   b. Ease of access
   c. Ease of uploading
   d. Ease of retrieval
   e. Lack of space
   f. Lack of time
   g. On the move
   h. No financial implication

iii. Instructional analysis
   The analysis involves review of relevant literature for the most appropriate procedures and strategies in tackling the issues/challenges identified which has been summarised in the section on Literature Review.

iv. Based on the user and context analysis, the data collected is summarized as follow:

   *Institution is consisting of:*
   a. 27 professional staff
   b. 9 support staff
   c. Job designations
   d. 3 domains with 13 categories

*The Training Management System generally requires:*

a. Documentation of evidence
b. Registration of participation data of staff
c. Reporting progress
d. Achievement of more than 7 days involvement in training and minimum 42 credit points

With the data collected and analysed above, the information helps to facilitate the stage of designing.

### 7.2 Design

This stage is a guiding stage where it helps the research team to determine the focus and path the way they need to embark on through clear performance objectives that comprise identifying, determining and developing instructional strategies to establish the basis of the platform for the prototype using Google sites.

### 7.3 Development

For the stage of Development, the processes involve three different phrases for this round.

*First Phase*

This phase focuses on establishing the general layout of the front page that incorporates the processes below:

i. Forming the Executive Team with designated tasks for systematic management of the project
ii. Creating logo of the prototype with its "meaning" to highlight the identity of the prototype
iii. Creating storyboard of the prototype
iv. Developing and adapting instructional materials for the prototype as specified in the storyboard to house all the intended aspects of the prototype on the main page namely:
    a. Header – Proud display of the name for the prototype
    b. Navigation Menu – Master menu that depicts various parts within the site
    c. Footer – Integrating a Visitor counter to keep track of the frequency users accessing the site
    d. Content – Main and brief elucidation of the product as general introduction to the site
    e. Layout – Integrating appealing but professional design using both borrowed and own resources

*Second Phase*

This phase focuses on establishing the database and linkages to the database as depicted in the following:

i. Creating the folders in Google Drive as database aligning them to the 13 categories of the training management system used at the stipulated case for all the staff
ii. Creating different pages for different departments
iii. Creating links in the Navigation Menu to different pages
iv. Creating different icons for different pages and members in a department
v. Establishing independent and secured link of each icon to its designated folder in the Google Drive
vi. Creating necessary buttons that link to external websites to facilitate easy and fast access to sources closely associated to the tasks and responsibilities of all staff.

*Third Phase*

This phase focuses on solidifying the commercial outlook of the prototype. The procedures involved:

i. Integrating designs
ii. Integrating graphics
iii. Integrating photographs to buttons to illustrate their functionality
iv. Integrating charts and graphs
v. Integrating external and free applications/tools for example, visitor counter
vi. Integrating textual descriptions for example introductory paragraph to describe the purpose(s) of the prototype and motivate the users in achieving the ultimate goal(s)
vii. Creating mobile application for the prototype using *AppsGeyser*, a free app creator and app maker to facilitate the creation of a DocuValet app for easy access via android for free.

### 7.4 Implementation and Evaluation (Formative and Summative)

At this stage, trying out is conducted. For this purpose, team training is crucial as team members are required to support the facilitation process for all the staff of the case to ensure smooth execution of the prototype. During the trying out stage, implementation and evaluation processes are carried out concurrently to enable continuous refinement of the prototype. The evaluation processes are made up of formative and summative evaluation.

For the stage on formative evaluation, the main strategies adopted are trial run and gathering feedback from the users. Formative evaluation is executed concurrently with the design and development processes that channel useful and practical feedback to the summative report so that improvement processes can be done to generate new ideas among the research team members to commence the fourth phase of the development (Refer to Figure 3).

## 8. Significance and Expansion of the Study

The creation of DocuValet (Figure 4) makes the updating of involvement in various continuous professional development activities by all staff particularly at this case, more convenient, relaxing, and easier. The designing and developing of DocuValet has enabled:

i. systematic documentation of evidence to facilitate better endorsement by the training management system coordinator
ii. easy access anywhere and anytime for all users to upload evidence,
iii. easy retrieval of evidence by all users if any of the documents are needed for other official purposes.


**Figure 4: Snapshot Part of DocuValet**

In addition, the designing and developing team anticipate this research can be elevated to a higher impact research as the usability of this prototype can be expanded to other settings which are also adopting the similar training management system to verify and monitor their staff's continuous professional activities. According to Northwood (2018), the main characteristics of high-impact practices incorporate:

i. interaction with faculty and peers
ii. work on real world application
iii. exposure to diverse ideas
vi. challenge the users' way of thinking
v. regular assessment on performance
vi. investment of time and dedication

The designing and developing team hope that the 6 characteristics of high-impact practices can be incorporated when the prototype is extended and shared to other organisations and subsequently establish well-promoted impacts of DocuValet for the benefit of those future users.

Nevertheless, for a product-based impact study, it should start with a credible and reliable product. All stages of its development should be clearly explained and substantiated to ensure that the production of the prototype is truly justifiable which is the main purpose of this paper before further expansion and sharing of the processes to other institutions are considered.

For the above-mentioned purpose, mini promotional tour has been commenced and conducted to the state education department, a teaching education institute, a district education office, a secondary as well as primary school to collect feedback of the usability of the prototype. At this juncture, it allows our research team to kill two birds with one stone. In addition to introducing the prototype to those institutions, the research team members take up the responsibilities as the ambassadors of the case which happened to be a leadership and management training institute for educational leaders to promote to potential candidates to take up the challenge in upgrading themselves in terms of attitude, skills, knowledge as well as mindset at the case to becoming effective school leaders for a brighter future of our education in Malaysia. This strategy helps to establish collaboration and networking with other institutions to highlight the importance roles played by this case.

The fourth phase (Refer to *Figure 3*) of the development is commencing as well at this point of time with the support of the data collected through the mini promotional tour. This phase is focussing on establishing and integrating a dashboard to display various activities held in and out of institution that may support further professional development among the staff. In addition, the dashboard may display the latest progress of all staff based on the 13 aspects in the Training Management System which may render swift and easy monitoring by the management.

Apart from that, writing and publication are two of the main functions of educational institutions and more articles, bulletins, pamphlets, infographics, and other reading materials are being produced by the academic staff. Hence, there is the need of creating a database on repository to house all the value-added materials for referencing not only among the staff but also other consumers from other institutions in time to come.

As the prototype is getting more complicated with all the existing and new functions, a manual will be useful to facilitate accessibility.

All which have been planned for the fourth phase will be clearly delineated in the next round of this study.

## 9. Epilogue

The outcomes of this paper may seem simple especially for those who are technologically savvy and equipped with programming skills to design comprehensive softwares and applications for the convenience of users. The detailed delineation of the development procedures in creating a simple application from scratch using google sites will truly be beneficial especially to those who do not have much knowledge in digital skills to create "website" look-alike applications for free from the internet.

The research team feels that the development of this prototype is timely especially during the outbreak of the pandemic when many of us especially teachers have to stay safe and work from home most of the time. Such simple prototype may serve to trigger ideas to create and innovate more creations among the educators whom the research team is planning to share with for them to create eModules, ePractices and so forth for the benefit of their learners.

And last but not least, it provides "an opportunity to adapt to the new reality faster, through the introduction of electronic document circulation and simplification of procedures leading to paper waste reduction" (Kacperczyk & Chromy, 2020). These efforts will also help reduce the carbon footprint and practice environmental-friendly procedures.

The effort of refining and upgrading DocuValet will never stop but be a part of our working life here at this case. Let it be the transitional platform that ensure proper execution of our professional duties and at the same time, the aspect of professional development is well taken care of for each staff.

"The journey of discovery is a pathway for recovery." (Lim, 2012)

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*Attachment A*

## OBSERVATION GUIDE FOR THE DEVELOPMENT OF DOCUVALET

| No. | Process | Tasks involved | Observation Log |
|---|---|---|---|
| 1 | **Analysis:** *The process of defining what is to be considered* | • Needs analysis<br>• Goal analysis<br>• Instructional analysis (content analysis & task analysis)<br>• User and context analysis | *Output indicators:*<br>• *Profile of People dan Project*<br>• *Environment in which the design and development takes place*<br>• *Environment in which the intervention is implemented*<br>• *Performance environment in which skills and knowledge are applied* |
| 2 | **Design:** *The process of specifying how it is to be carried out* | • Writing of performance objectives,<br>• Identifying, determining, and developing instructional strategies<br>• Identify resources | *Output indicators:*<br>• *Instructional strategies*<br>• *Prototype specifications* |
| 3 | **Development:** *The process of authoring and producing the materials* | • Work with producers<br>• Creating the intended story board<br>• Developing or adopting instructional materials (images, presentations, video clips, multimedia materials, web pages, etc.) | *Output indicators:*<br>• *Story board*<br>• *Instructional materials involved* |
| 4 | **Implementation:** *The process of creating the prototype in the real-world context* | • Team Training<br>• Trying out | *Output indicators:*<br>• *Team commands and feedback*<br>• *Time-on-task*<br>• *Decision made*<br>• *Difficulties and challenges*<br>• *Opinion about the ID process*<br>• *Users' attitudes*<br>• *Subject matter experts' views and recommendations* |
| 5 | **Evaluation:** *The process of determining the appropriacy of the prototype* | • Refinement and re-examination | |

*Attachment B*

## INTERVIEW PROTOCOL FOR THE DEVELOPMENT OF DOCUVALET

1. What are the analysis processes conducted in developing the prototype?
2. What are the intended designing processes involved in developing the prototype?
3. What are the developmental processes involved in developing the prototype?
4. How are the implementation processes executed in developing the prototype?
5. How are the evaluation processes undertaken in developing and refining the prototype?

**The elements specified in the output indicators for each process in the Observation Guide are used as guide to frame interview questions:**

| No. | Process | Aspect for Interview | Responses |
|---|---|---|---|
| **1** | **Analysis:** *The process of defining what to be considered* | *Output indicators:*<br>• *Profile of People dan Project*<br>• *Environment in which the design and development takes place*<br>• *Environment in which the intervention is implemented*<br>• *Performance environment in which skills and knowledge are applied* | |
| **2** | **Design:** *The process of specifying how it is to be carried out* | *Output indicators:*<br>• *Instructional strategy*<br>• *Prototype specifications* | |
| **3** | **Development:** *The process of authoring and producing the materials* | *Output indicators:*<br>• *Story board*<br>• *Instructional materials involved* | |
| **4** | **Implementation:** *The process of creating the prototype in the real-world context* | *Output indicators:*<br>• *Team commands and feedback*<br>• *Time-on-task*<br>• *Decision made*<br>• *Difficulties and challenges*<br>• *Opinion about the ID process*<br>• *Users' attitudes*<br>• *Subject matter experts' views and recommendations* | |
| **5** | **Evaluation:** *The process of determining the appropriacy of the prototype* | | |