

## CHAPTER THREE

### METHODOLOGY

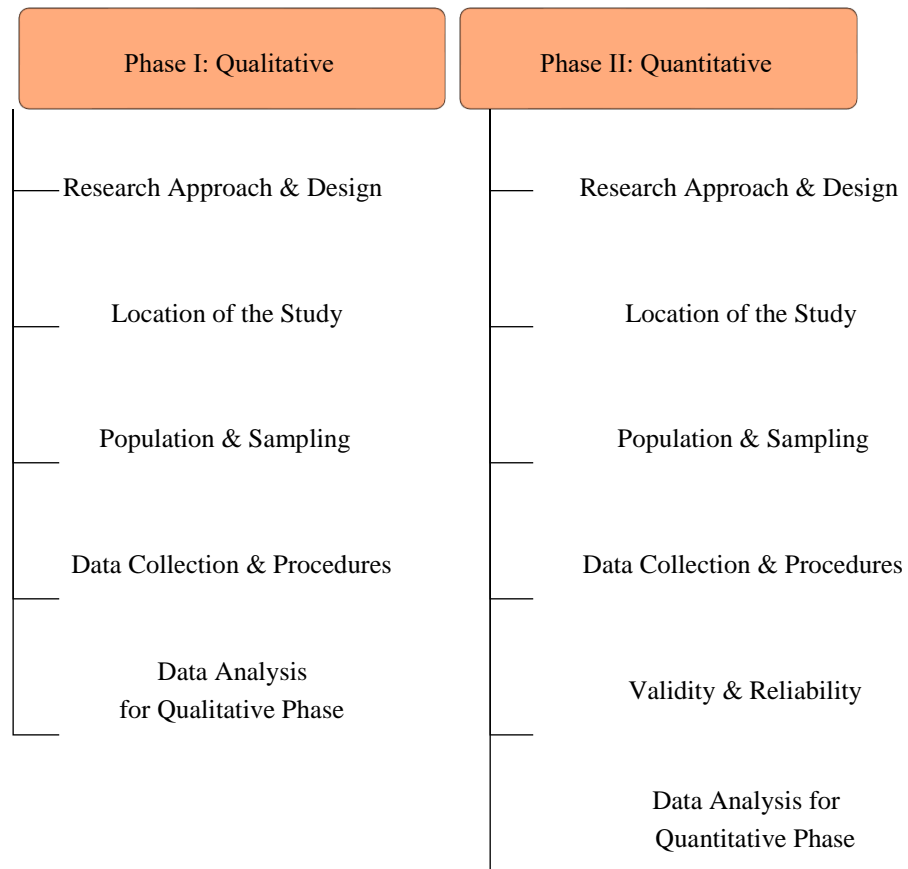
#### 3.1 Introduction

This chapter clarifies the process of researching this topic adopted in this study. It identifies its analytical framework beginning with its methodology and nature, location of the sample, population and sampling, instruments used, and data collection and procedures. Specifically, the researcher uses mixed methods by combining qualitative and quantitative tools. The chapter then discussed the validity and reliability of the instrument. Lastly, the data analysis procedure that was applied to find the usability of digital comic was explained.

#### 3.2 Research Design

Research methods have been identified as qualitative and quantitative method. Qualitative method of data collection technique involves interview or data analysis (Saunders et al., 2007). Meanwhile, quantitative research involves numeric description of trends, attitudes, and opinion of a population by studying a sample of that population. According to Creswell (2014), quantitative research approach is to test the theory of objective by examining the relationships between variables.

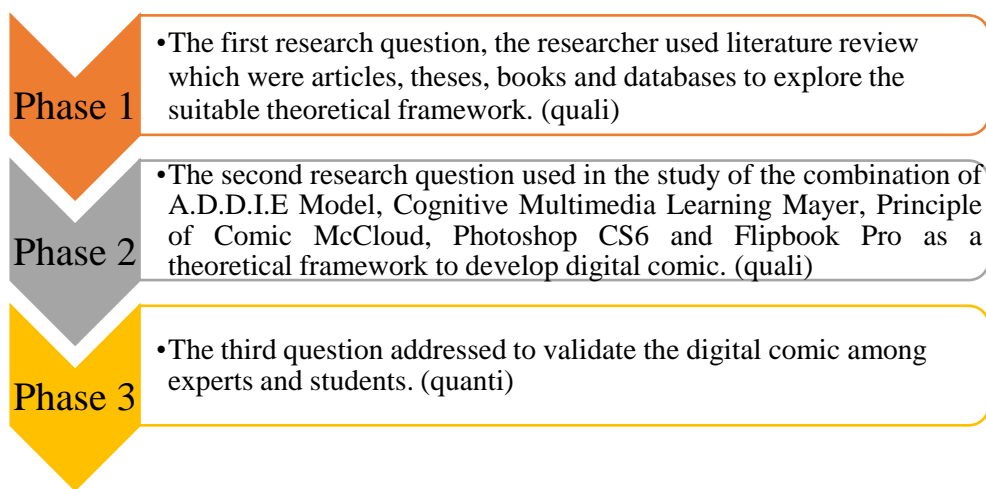
Specifically, the researcher used mixed methods by combining qualitative and quantitative methods. The researcher had divided the methodology into two phases, as in Flowchart 3.2 below:



**Flowchart 3.2 (i): Qualitative and Quantitative Phases**

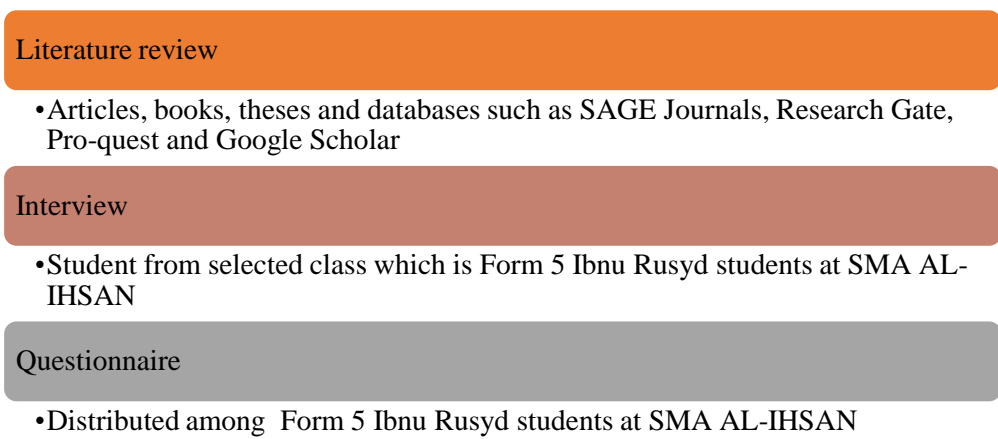
The researcher used the qualitative method, the semi-structured interview to get the students validation and feedback on features and use of the digital comic. In the

meantime, the quantitative approach which is questionnaire is used to validate the digital comic among the Form 5 Ibnu Rusyd students. The researcher divided the research questions into three phases. Data collection of this study was arranged based on the research questions that illustrated as below:



**Figure 3.2(ii):** Data collection for Mixed- methods

The data were obtained from the sources categorized below:



**Figure 3.2(iii):** The data sources

In collecting the data and information related to the research topic, data was collected from multiple sources such as document analysis, interviews, and a survey questionnaire.

### **3.3 Location of the Study**

For this study, the qualitative research involved a semi-structured interview was conducted at SMA Al-Ihsan. The quantitative study also took place among the Form 5 students of the school. The participants involved were 33 students of Form 5 Ibnu Rusyd students. This school was selected by considering as it's one of the well-known Islamic schools in this state.

### **3.4 Population**

The target population for this study was Form 5 students who studying PQS subject in SMA Al-Ihsan. The school chosen was located at Kuantan, Pahang. This school is only one of the Islamic secondary schools that established under government JAIP at this city. This school was selected due to it was very well-known and established Islamic school. Besides that, the selection of this school was also based on the researcher's past experience during her internship at this school.

During the researcher's observation, despite of their excellent in education, some of them that comes from lower class have still does not achieve excellent level towards this subject. The current study, the researcher was interested to investigate the usability of digital comic in this school and hopefully future studies can focus on the evaluation of its usability. These students of this school were selected in this study as they have more information about the PQS subject as they directly involved during learning process of this subject.

### **3.5 Sampling and Sample Size for Qualitative Study**

#### **3.5.1 Sampling**

This study used purposive sampling for selecting participants for the qualitative part. Sampling technique is a process of selecting a sample from a given population. There are different types of sampling techniques such as simple random sampling, systematic sampling, cluster sampling, deliberate sampling, quota sampling, and

stratified sampling. However, in this study employed purposive sampling. According to Arikunto (2010: 183), purposive sampling was the process of selecting sample by taking subject that is not based on the level or area, but it is taken based on the specific purpose.

Purposive sampling where a researcher selects a sample based on the needs about the study and the purpose of the sample (AY Rusmana, 2017). Purposive sampling enables researchers to consider participants' knowledge, experience, availability, and willingness to participate and their ability to express their opinions. Purposive sampling is the appropriate technique to be used for the identification and selection of the information for the most effective use of limited sources (Patton, 2002). Creswell and Plano (2011) explained that this involved identifying and selecting individuals or individuals that are especially knowledgeable about or have experience with a phenomenon of interest.

Purposive sampling (also known as judgment, selective or subjective sampling) was a sampling technique in which researcher relies on his or her own judgment when choosing members of population to participate in the study. Purposive sampling was a non-probability sampling method and it occurs when "elements selected for the sample are chosen by the judgment of the researcher. Researchers often believe that they can obtain a representative sample by using a sound judgment, which will result in saving time and money" (Black, K. 2010).

The present study focused on purposive sampling whereby the researcher chooses respondents based on their judgment/purpose that they have desirable

characteristics and can provide the required information. Researchers use purposive sampling because want to access a particular subset of people on this topic. The sample was chosen based on their experience and involvement of academic's program and behaviors.

### **3.5.2 Sample size**

The sample size for the qualitative part of this study was 5 participants. Some qualitative researchers recommended five to 25 as adequate sample size for interviews (Creswell, 1998). Therefore, there was a total of 165 students of Form 5 and there are five classes at SMA-Al Ihsan. From these 165 students, only 5 students among Form 5 student from different classes are selected to participate the interview.

The selection of 5 different classes was chosen because these students who are active in academic and curriculum, as they can share their experience and different feedbacks hence, they were justified under the sample elements that are specifically those who are studying and learning of PQS subject.

## **3.6 Sampling and Sample Size for Quantitative Study**

### **3.6.1 Sampling**

Probability sampling typically which consisted of the researcher to choose individuals who represented a particular population, which was the most intensive type of sampling in quantitative research. This was attributed to their capacity to state the sample to characterize a population (Creswell, 2008). In this study, a simple random sampling design was utilized for the target population, which were among Form 5 students. Therefore, these 33 students from 5 Ibnu Rusyd class were represented accordingly, by the possibility for selection out of the population.

Creswell (2009) describes simple random sampling technique as a kind of data collection which participant has the same possibility of being selected and the sample can be generalized to the bigger number of populations. The researcher intended to use a random sampling procedure where participants were being selected from random classes in the school.

### **3.6.2 Sample Size**

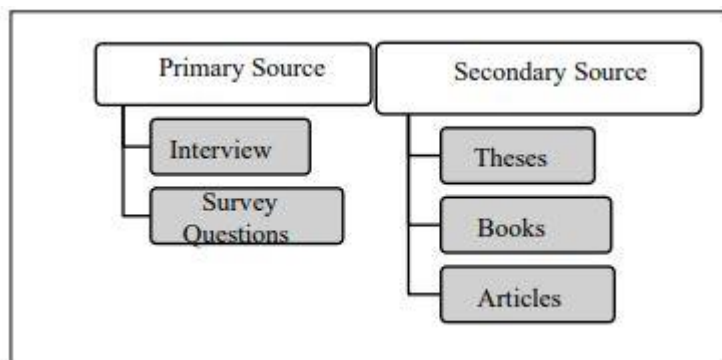
This research applied simple random sampling method where the target respondent directly toward the users of the digital comic in SMA Al-Ihsan which is the Form 5 students who taken the PQS subject. The researcher was interested to used simple random sampling among the 33 of Form 5 Ibnu Rusyd students by distributing the questionnaire in order to make the data more valid. The researcher discovered a fair amount of sampling as the results of the quantitative analysis were intended to support

the conclusions of the qualitative study to investigate the suitable framework to develop digital comic.

The selection of this class was chosen based on the level of their achievement towards this subject and their academic background. Moreover, based on the interview with the PQS teacher, most of students from this class have lower score during learning this subject and they were having difficulties in expressing the ideas. As far as the pure background of PQS subject is concerned, the researcher found it better adapted a student that had lower class in PQS subject as a target participant on this study.

### 3.7 Research Instruments

In this study, the researcher splits the data sources into primary and secondary sources. The instruments used rely on the analysis of the data used in Figure 3.7.



**Figure 3.7:** The types of data used in this study

#### 3.7.1 Primary Source

### **3.7.1.1 Semi-Structured Interview**

The researcher was conducted a semi-structured interview consisting of elements of both structured and non-structured interviews. The researcher prepared the formal question and used the freedom to develop the questions and explored them in advance. The researcher used the qualitative research method promoted by Creswell's (2003) definition, which illustrated the interactive qualitative research which required the researcher to collect data by face-to-face approach. As mentioned above, the data collection approach for this study was a semi-structured interview, which indicated the fundamental methods of qualitative research design.

### **3.7.1.2 Survey Questionnaire**

The researcher also has used a survey questionnaire to address the questions regarding the usability of digital comic among Form 5 students. For Burn & Grove (1993), a questionnaire was used as a data collection tool.

### **3.7.2 Secondary Source**

The researcher directly reviewed and cited the documents for printed documents such as Al-Quran and printed books whereas, for the electronic materials, the researcher collected the information from various sources of databases such as Sage Journals, ACM Digital Library and Research Gate, Pro-quest, Jostor, and Google Scholar.

### 3.8 Validity of The Research Instrument

Validity examines the degree to which a research study actually measures and interprets the things it intended to accomplish. Creswell (2012) defined validity as the progression of credible confirmation and evidence to demonstrate that the test's suggested application is consistent with how the test's findings are interpreted in relation to the concepts or constructs, they are supposed to measure.

An instrument was valid if it measures what it was supposed to measure. The instrument which is the questionnaires that was used to collect data for this study was adapted and developed based on the study of Promono (2020). The validity of an instrument can be deduced from many perspectives, such as face and content, validity; concurrent or predictive validity; and construct validity (Kumar, 1996). In this research, both of the face and content validity, also the construct validity tests were conducted.

Hardesty and Bearden (2004) describe face validity as a technique or procedure that looks as if it should measure the variable, it expects or intends to measure. However, it determines the value of questionnaire by looking at questionnaire. Meanwhile, content validity refers to the adequacy with which a measure or scale has sampled from the intended universal or domain of content manual (Pallant J. 2007). However, Anastasi & Urbina (1997) described content validity as type of validity which non statistical form involves the examination system of the content test to confirm that the behaviors domain is measured by representative sample.

For the face and content validity of this study, the researcher had been distributed the questionnaire to the team experts which were the supervisor and the teacher in order to seek their opinions on questionnaire and feedbacks. Therefore, the questionnaires for this study were sent and referred to team experts to evaluate the quality of the questionnaires and to check their usefulness. In other words, the team experts who are academicians within the related field of study were asked to review the draft of the questionnaire to confirm the survey that has been covered main aspects of study and could be easily understood by the respondents.

Lastly, the researcher has used construct validity. Cronbach and Meehl (1955) determined that construct validity is whether the measurements of a variable in a study behave in exactly the same way as the variable itself. That involves examining past research regarding different aspects of the same variable. In other words, it is a determination of the significance, meaning, purpose, and use of scores from an instrument. Meanwhile, the pilot study had been conducted by the researcher in order to test if the questionnaire and survey work perfectly. In this study, the researcher has used Cronbach' correlation coefficient to test the reliability and validity of the instruments.

Generally, the interview questions were sent to the team experts in the field of subject research which were the supervisor and teacher to figure out errors and phrases that lead to misinterpretation and to check if the questions are clear, understandable, and capable of answering the research questions of the study. Then, changes were made on the interview questions based on their suggestions. The team experts also have

checked the sensitiveness and appropriateness of the survey items as well. They gave positive feedback about the instruments and felt the questionnaires were pertinent to their respective groups. Then final revisions of the questionnaires were made based on their feedback.

Thus, to check the appropriateness of the items that related with the content or subject matter, the questionnaires validations also was made by media expert to evaluate the items content-related digital comic.

### **3.9 Pilot Study**

Pilot studies can be defined as a small-scale preliminary study that are carried out with the intention of assessing timing, feasibility, costs, charge or costs, adversative activities, as well as influence size (statistical variability). They aim to establish adequate sample sizes and improve research designs before carrying out a full-scale research project (Walters, 2019).

Pilot studies can be based on quantitative and/or qualitative methods and largescale studies might employ a number of pilot studies before the main survey is conducted. In establishing the validity of the instruments, the researcher conducted a small pilot study to determine if the questionnaires used greatly answered the posed questions. The purpose of the pilot test was to determine whether the items were reliable or trustworthy, or if they a high degree of internal consistency (Piaw, 2012).

Through the pilot test, it also helped the researcher to evaluate the suitability of the research questions and make necessary improvements of the actual research.

It takes 30 samples from the population to run a pilot test (Hair et al., 2007). To make sure that the scale items, instructions, and questions were understandable by the responders, a pilot test was conducted (Pallant, 2011). Pallant (2011) asserts that a pilot test can offer measurement reliability value, which Cronbach's alpha results can be evaluated by greater reliability with higher results. According to Hair et al. (2007), the minimum amount of coefficient alpha is 0.70.

In this study, the pilot test was carried out first among 30 respondents in SMA Al-Ihsan on Jun 2018. The purpose of the pilot study on a limited scale is to assess the questionnaire and phrases as well as the consistency of questionnaire items. Additionally, carrying out pilot research will improve the design of the data collecting tool and reduce the amount of time needed to collect the primary data during the actual study. Many studies rely on pilot research to enhance the data in the main study and prevent mistakes in the questionnaire design, item wording, and item interpretation.

### Scale: Pilot Test

Case Processing Summary			
		N	%
Cases	Valid	30	88.2
	Excluded <sup>a</sup>	4	11.8
	Total	34	100.0

a. Listwise deletion based on all variables in the procedure.

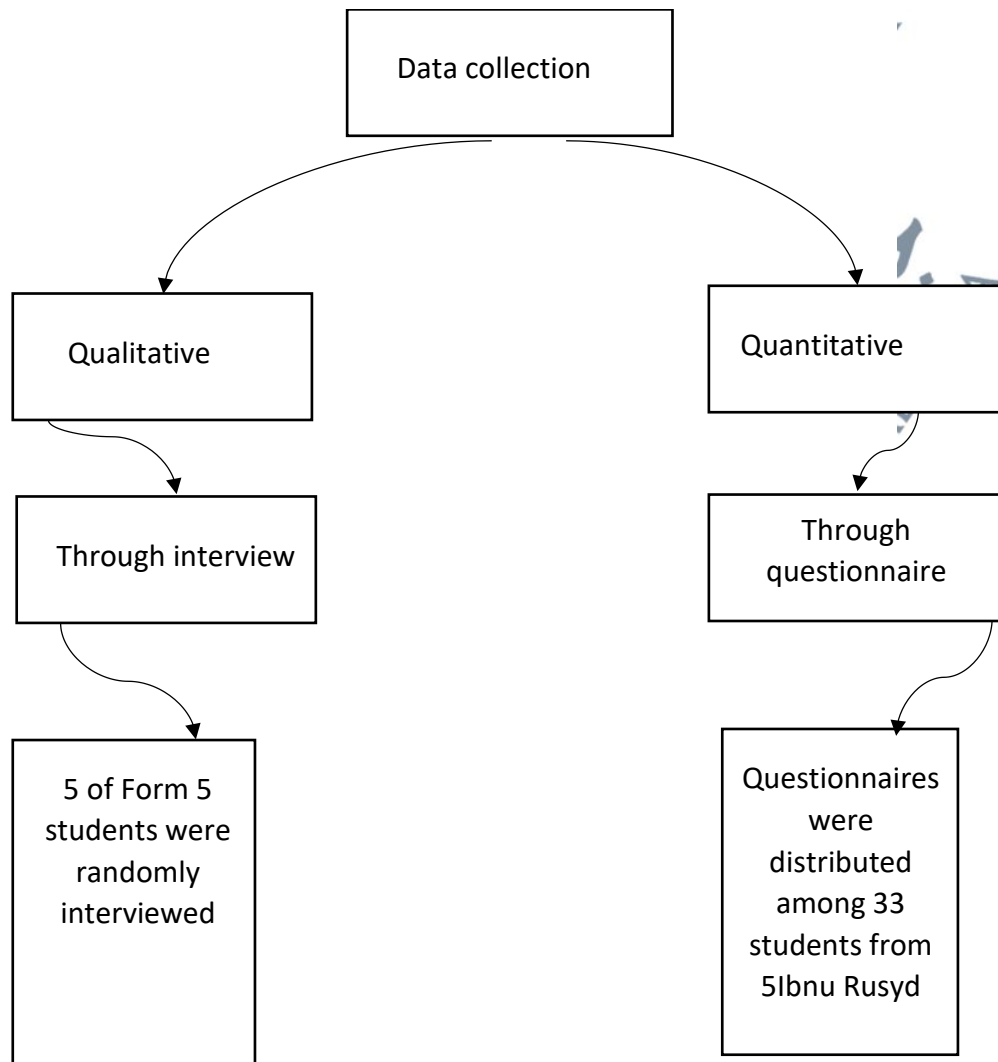
Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.933	.935	28

**Figure 3.9:** Reliability of Pilot Study

The data from pilot study has been analyzed yield the table structure SPSS indicates that the reliabilities coefficients Cronbach's Alpha is 0.90 (90%). The present reliabilities of information collected in relation to the totals itemized items used in the pilot test surveys are "Excellent," which is regarded as the degree of the best standardized examinations in statistical methodologies. The pilot study result showed (Figure 3.9) that the alpha values for the questionnaires exceeded the cut-off point of 0.933. Most of the pilot test samples agreed that the questionnaire was readable and easy to understand. Overall, no issues with the questionnaire were found, thus, the survey was declared complete.

### 3.10 Data Collection and Procedures

Quantitative and qualitative data were collected in this study. The following diagram illustrates the procedures of quantitative and qualitative data collection.



**Figure 3.10:** Procedures of Data Collection

### 3.10.1 Data Collection for the Qualitative Study: Interview

Field research composes a number of research methods to solve the existing research problems such as case study, interview and observation (Walliman N, 2011). The researcher decided to conduct individual semi-structured interview to collect qualitative data. Based on Thomas, Nelson and Silverman (2015), the interview is undoubtedly become the most common source of data in qualitative studies. In this context, Hackett (2003) enumerated that the selection interview will ensure a better selection of people.

Interview method was one of the ways to obtain primary data. Primary data was understood as data which was collected during the conduction of a particular research. Therefore, in order to obtain primary information, face-to-face interviews were employed. The researcher has prepared written questions to the interviewees by used the semi structured interview. In this context, the semi structured interview protocols ask specific objective questions in an arranged order. In addition, the questions were well structured, planned and organized in line with the objective of the study. This process encouraged the participants to respond to the questions as accurately as possible. All interviews have been transcribed in the Microsoft Word programs.

The interview questions were designed in English Language but to ensure proper responses from the participants, the interview process was also conducted using the mother tongue language (Malay). The responses were later carefully transcribed and translated to English to fit the requirement of this study. The use of the mother

tongue language was used for those individuals who could not understand English thus enabling them to contribute relevant information in relation to the topic under study.

The semi-structured interview was carried out with open-ended questions. The questions asked was divided into five questions. The interview conducted for approximately 30-40 minutes and lasted about ten minutes long each. The advantage of the semi structured interview is that the participants expressed themselves in their way for the interview to contain the discussion and keep the information from being sought in the forefront of the discussion.

The participants were among five student of Form 5 students from different classes which were interviewed purposively. These students were selected because they were directly involved in the learning of PQS subject. The researcher was combined all the various responses and experiences with these participants to investigate the usability of the digital comic. Interviews with all participants have been done during March 2022. Semi-structured interview was conducted and conversation was taking by hand writing notes. During interviews, the researcher recorded all the discussions with all participants for transcription purpose by using an audio recorder.

A set of interview questionnaires and the interview transcript are attached in appendix respectively. The interview questions were prepared with the thesis's goals and objectives. The interview questions were extensively and carefully selected to ensure quality. A semi-structured open-ended questionnaire was based on:

- a) Concept of learning process when using digital comic.
- b) Potential implementation of digital comic application of PQS subject.

c) The suggestions of implement the digital comic application.

The questions about the subject area were asked based on this approach. Below is the list of the interview questions:

**Table 3.10.1:** List of The Interview Questions

No	Items
1	Do you like the learning process doing with digital media? For example, Comic, Animation Video, and etc.
2	Why do you like the process? The way of learning.
3	Why do you state that the process of learning is easier to do?
4	Are you sure that the process of your understanding to the PQS subject will be improved if the new learning media applied? Please give the reasons.
5	What do you suggest to the researcher? Do you have any to the researcher?

### **3.10.2 Data Collection for the Quantitative Study: Questionnaires**

The data used in this quantitative study was gathered through a questionnaire.

A questionnaire is a tool for gathering data that asks a number of questions of respondents with the intention of learning more about them (Abawi, 2013). In a survey design, a questionnaire can also be thought of as a form that asks respondents to fill

out and return to the researcher with demographic data, personal information, and answers to questions (Creswell, 2012).

A questionnaire can give numerical data that can be statistically analyzed to explain trends in replies and to test theories or research issues (Creswell 2012). Additionally, the information obtained by a questionnaire is uniform, can be easily gathered from a large number of respondents, and allows for the comparison of the findings. Additionally, questionnaires are a useful tool for gathering data provided the researcher gets clear on the variables or indicators they wish to measure (Sekaran & Bougie, 2010).

The researcher used a self-constructed questionnaire instrument based on literature. Initially, literature search was performed to discover any established validated questionnaire. However, self-constructed survey has been used to collect data. The researcher also was referred and constructed the questionnaire based on Promono (2020) study on digital comic. A structured questionnaire was designed to fulfil the study objectives. The questionnaire used a five-point Likert-type scale, where 5= Strongly Agree, 4 = Agree, 3= neutral, 2= disagree, and 1= strongly disagree.

The questionnaires consisted of two sections. The first section was concerned with the personal or sociodemographic of the participants, such as age and gender. The second section enquired about the usability of development of digital comic. The questionnaire comprised of 28 items. The participants have been chosen because they are accessible, available at the specified time, and eager to take part in the study. Thus, the willingness is very important because the researcher wants to work with the

respondents to complete the data collection process. In addition, it can help saving the time (Dornyei, 2007; Lisa, 2008).

Before distributing the questionnaire, the researcher has asked for approval from the teacher who teaching PQS subject in SMA Al-Ihsan. This approval is necessary to this study to get a good cooperation from the teacher to ensure this collecting data was conducted legally. After getting the approval from the teacher, the researcher has set up the date for distribute the questionnaires at the appropriate time.

The researcher has distributed the online questionnaire through Google form to a teacher, Ustazah Fairuz Adibah. The teacher forwarded the survey link to the participants through class WhatsApp group. The researcher writes a short message in WhatsApp and explained the goal of this study to the respondent that contains together with the Google form link. The respondents have also been notified that their participation in the study is on a voluntary basis and that all information and feedback will be held in confidentially. The researcher benefited from this cooperation and made special request to teacher to make sure these students answer the questionnaires. On the next day, the teacher has informed to the researcher that the respondents have completed the questionnaires.

The language used was in Bahasa Malaysia and has been evaluated to make it simple and understandable to define the concept. The language must be easily understood, simple, avoidance of ambiguous meaning and written in familiar to the respondents (Roopa & MS, 2017). The Malay language questions have been evaluated by a lecturer together with the content experts to confirm it is tally with the intention

of the questions. It was then being back-to-back translated into English version and verified by the team experts to gain validity and reliability.

### **3.11 Data Analysis**

Data analysis is the process of generating the data to be clearly understood especially for the researcher (Fraenkel & Wallen, 2007). Similarly, Creswell (2012) also argue that data analysis is the process for all the gathered information from respondents to be made easier to all. Data analysis is the process of systematically searching and compiling data obtained by interviews, field notes and documentation, organizing data into categories, describe into the units, synthesize, organize into a pattern, choose which is vital and which can be studied, and make inferences which will be easily understood by ourselves (Sugiyono, 2011: 335). This includes the process of summarizing of all the respondents 'data. In other word, the main purpose of data analysis is to get an exact meaning of the data so that a conclusion can be come out in which the conclusion's answering back the research questions of the study.

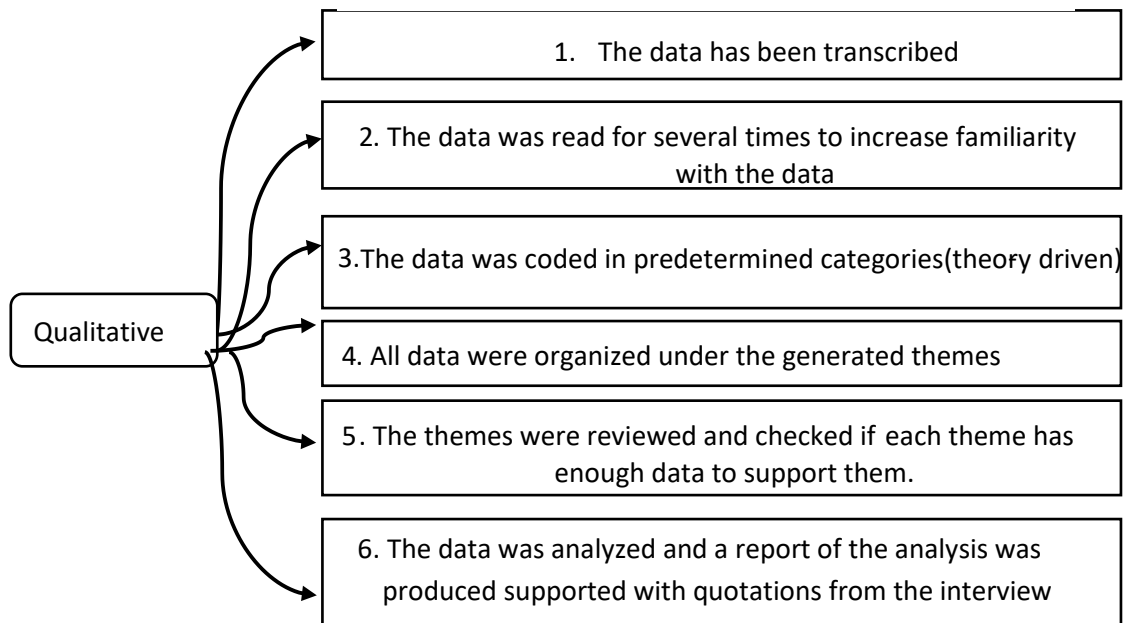
The qualitative data of semi structured interviews had been analyzed by thematic analysis. The researcher had transcribed the interviews into texts and create themes from many ideas extracted from informants.

Whereas, the quantitative data analysis was analyzed by descriptive statistics using statistical software known as Statistical Package for the Social Science (SPSS) Version 20.0. SPSS is a software product used for statistical analysis. SPSS is capable of handling large amounts of data and can perform all of the analyses covered in the

text and much more. SPSS has become one of the most widely used statistics programs in the social sciences research. SPSS was also chosen because of its compatibility with most other software packages and its user-friendliness used for data analysis (Field, 2009). The purpose of doing descriptive statistics was to check the mean and the standard deviation of each variable (Adnan et al., 2011).

### 3.11.1 Data Analysis for the Qualitative Part

The following diagram illustrates the data analysis procedure of the qualitative part of this study.



**Diagram 3.11.1:** Procedures of qualitative data analysis

### 3.11.1.1 Thematic Analysis

As mentioned above, the data collection approach for this study was a semi-structured interview, which indicated the fundamental methods of qualitative research. A qualitative research design allows participants to react freely using their own words and standpoints. The researcher has chosen semi-structured interviews as it will be conducted for one respondent at a time, include a combination of closed-ended and open-ended questions, frequently followed with a follow-up on whether or how questions can be answered. In this study, thematic analysis was used as an approach to the qualitative data (Braun, 2006, et al., 2013).

This study used Braun's and Clarke's (2006) six of thematic analysis to analyse qualitative data. Since it doesn't require the same level of in-depth theoretical and technical understanding that other approaches do, thematic analysis is an easy-to-understand this kind of qualitative analysis that is helpful even for individuals who are just learning qualitative techniques (Bruan & Clarke, 2006). Finding the importance of themes and patterns in a data collection and integrating them with the research question are the goals of this study (Braun, et al, 2014).

The interview was conducted and was recorded, after which the audio file was listened to and manually typed into the computer. The transcriptions were all written in the Microsoft Office Word 2013 version. After that, the information was kept in the folder in order to identify the insightful themes. However, the researcher read through the complete data collection numerous times in order to start the analysis process and

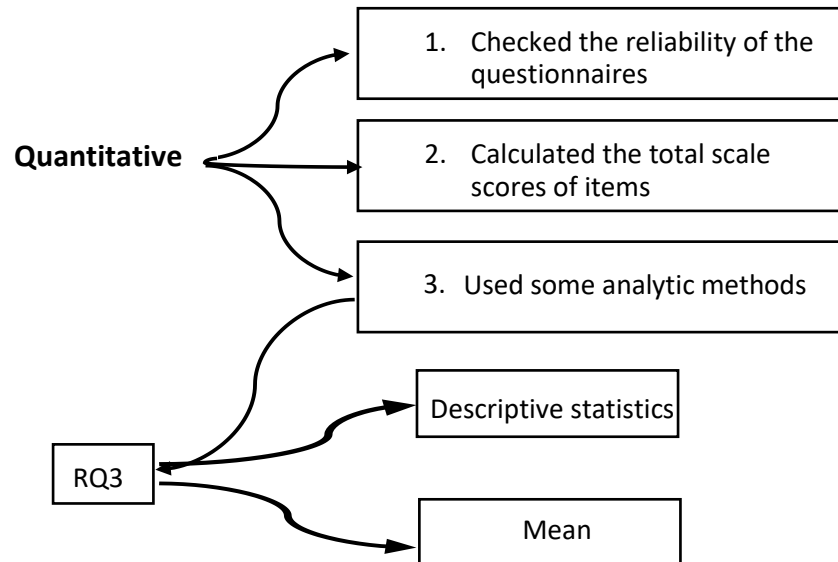
become more familiarized with the information. The researcher was then reread the transcriptions in order to identify out the important sections.

This is known as the data reduction phase, during which the significant portions are coded and the theme is found. After that, it was divided into categories based on various themes in order to adhere to the research framework and respond to the research questions. Case-by-case analyses of the themes has been done.

### **3.11.2 Data Analysis Procedures (Quantitative)**

The following diagram illustrates the data analysis procedure of the quantitative part of this study.





**Diagram 3.11.2:** Procedures of Quantitative Data Analysis

A quantitative methodology attempted to fulfil the research questions stated in Chapter 1. A survey questionnaire was carried out among the selected class which is Form 5 Ibnu Rusyd students of SMA Al-Ihsan. The data from the questionnaires were then analyzed by using a statistical tool known as the SPSS. SPSS is a software application that is used for statistical analyses. The researcher was chosen SPSS because it works with the majority of other software programmers and is simple to use for data analysis which calculated the mean value based on the respondents' preferences to determine the usability of digital comics.

In the data analysis of the quantitative study, the researcher highlighted the descriptive statistics. Array et. Al (2005) asserted that descriptive statistics were

encouraged when examining and elucidating the information gathered from the respondents. The descriptive analysis was used to analyze the data from preliminary studies' results. The data obtained from questionnaire sheet was then analyzed by using descriptive analysis techniques. Descriptive analysis techniques were performed by using descriptive statistics. Descriptive statistics were used to analyze the statistical data to describing or depicting the info collected without meaning to generally accept conclusions or generalizations (Sugiyono, 2011: 207).

Measured statistics which is included means, percentages, medians, ranges, and variances. However, in this study, the researcher has used statistical analysis techniques as to obtained the data of students' questionnaires to find a mean scores through a calculation process using Statistical Package for the Social Sciences (SPSS) 17.00 for Windows. The data analysis in this study also included the validity of the media obtained from the validation results of the media expert and a teacher. It was analyzed quantitatively using the following formula.

$$\text{Mean score} = \text{Assessment scores} / \text{Number of questions.}$$

The student's questionnaires were analyzed using the following formula.

$$\text{Mean score} = \text{Assessment scores} / \text{Number of student's responses}$$

The researcher also has tested the reliability of each item of questionnaires dependent on Cronbach's alpha value. To assess the reliability of a survey instrument,

the Cronbach's alpha value calculates the internal consistency or average correlation of its items. The range of the Cronbach's alpha is 0 to 1. The scale developed was more accurate with the higher ranking.

### **3.12 Reliability Test for The Study**

Reliability's purpose is to analysis the goodness of conceptual and operational definitions (Neuman, 2006; Wimmer & Dominick, 2006). It concerned on the consistency of the measurement (De Vaus, 2001). However, this study analyzed reliability test of both of quantitative and qualitative research approaches. Moreover, it was tested for pilot study and final study in order to make sure that results of this study were reliable.

Reliability is essential to the effectiveness of any data gathering procedure (Best and Kahn, 2003). Reliability is the degree of consistency that the instrument of procedure demonstrates. Whatever it is measuring, it does so consistently. For the purpose of this study, the researcher carried out a pilot test on the instrument in Jun, 2018. Responses from the pilot study were thus exposed to a reliability test using Cronbach's alpha coefficient. The results of scaled items used in this study for both pilot test and final survey data collection are presented in Table 3.12.

The results for reliability test to determine the effective of the result of the study. The Cronbach's alpha internal consistency on various part of instrument has been covered about the development of digital comic. Salkind (2008) said that the

reliability is a test to measure the consistency of the result. This occurs when a test is conducted repeatedly and produces the same result for each test.

**Table 3.12:** Reliability Cronbach's Alpha Classifications

<b>Alpha values</b>	<b>Grade</b>	<b>Interpretation</b>
0.90 and above	Excellent	Reliability of data at the highest level of the best standardized tests.
0.80 - 0.90	Very good	Data is very good for the test
0.70 - 0.80	Good	Data is good for a test; in the range of most. There are probably a few items that could be improved
0.60 - 0.70	Low	This test should be supplemented by other factors to determine grades. There are probably some items that could be improved
0.50 - 0.60	Very low	Alpha value suggests a need to revise the test, unless it is quite short (ten or fewer items). The test must be supplemented by other factors for grading.
<0.5	Bad	Data is not consistent below Questionable reliability. This test should not contribute heavily to the course grade, and it needs revision

In this study, reliability tests were conducted through Statistical Package of Social Science (SSPS) Version 20.0 through the evaluation of internal consistency in which the Alpha Cronbach coefficient measure is employed (Yusliza & Ramayah, 2012). If the reliability test result of Cronbach 's Alpha ( $\alpha$ ) value is less than 0.61, it is considered weak. If the value is between 0.61 to 0.79, it is considered within the acceptable range, and if the value is 0.8 and above, it is considered high and accepted (Sekaran & Bougie, 2016).

**Scale: Usability of Digital Comic**

Case Processing Summary			
		N	%
Cases	Valid	33	97.1
	Excluded <sup>a</sup>	1	2.9
	Total	34	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.902	.902	28

**Figure 3.12:** Result of Reliability Statistics

In final study, the reliability tests based on Figure 3.12 column N referred to a list of questions used by the researcher and the result obtained was 0.902, which is considered reliable. The purpose of the study was to assess the usability of digital comic. In other words, it articulated the usability of digital comic to be accepted as being capable to help students in learning PQS subject.

### **3.12.1 Reliability of Themes from Inter-Rater**

It is important to ensure that validity and reliability do not get confused. Reliability is the consistency of results when the experiment is replicated under the same conditions, which is very different to validity. Researcher used to code the interview answers by using thematic analysis to write and gathering the meaning of participants' answers. The reliability of quantitative was through pilot study and final study. Whereas, the reliability of qualitative semi structure interview was through entering letters to verify the themes by using thematic analysis.

### 3.13 Methodology of Digital Comic Development

The methodology used to develop digital comic is by using the theoretical framework which were the combination of cognitive theory of multimedia learning Mayer (2001), A.D.D.I.E Model, McCloud's (1993) principle of comic and Flipbook pro was used to develop digital comic. The A.D.D.I.E Model, which consist of Analysis phase, Design phase, Development phase, Implementation phase and Evaluation phase are breakdown into three main steps, namely: pre-production, production and post-production.

**Table 3.13:** A.D.D.I.E Development Process of Digital Comic

Phases	Stages of Animation	Theoretical Framework of Motion Comic (Ekram & Zaffwan, 2016)	Theoretical Framework of Digital Comic
Analysis	Pre-Production	-Character drawing	-Preliminary study -Analyse student's problem and needs
Design		-Concept illustration -Storyboard	-Character design -Identified characteristics

			-Making script & storyboard
Development	Production	-Adobe Photoshop -Adobe After Effects -Adobe Sound Booth	-Adobe Photoshop CS6 -Flipbook pro
Implementation	Post-Production	Adobe Premiere	-Products Manufacturing
Evaluation			-Features testing -User testing and evaluation

### 3.13.1 Pre-production

It is a stage that starts from a story idea, development of animated stories, concept creation, character design, storyboards and initial animatics to find out the overall animation timing. At this stage, the analysis phase and design phase were beginning.

### **3.13.1.1 Analysis Phase of User Need**

The analysis phase was done by collecting preliminary data to collect the information about user needs. The data was based on the textbook of curriculum used, user needs and student problems, student learning environment, literature studies, comic concepts and both software and hardware with specification tools has been identified. Here, the interpretation of every stage of the analysis is presented. At this phase, a preliminary data which was an interview has been conducted with the students to get information about the learning activities, analyzing the PQS subject activities and examining the underlying problem in learning media development.

### **3.13.1.2 Digital Comic Maker Tools**

In this analysis phase, an appropriate tool also needs to be carried out to develop digital comic. In this study, the researcher has used tools (hardware's and software's) with the following specifications:

#### **a) Laptop/Notebook**

Laptop/Notebook Acer Aspire E14 (E5-475G-5115) with following specifications:

**Table 3.13.1.2 (i): The Laptop Characteristics**

Specifications	
Processor	Intel Core i5-7200U 2.5 GHz with Turbo Boost up to 3.1 GHz.
Graphics Card	NVIDIA GeForce 940MX with 2 GB Dedicated VRAM with 8 GB (8192 MB) DDR4 Memory (Random Access Memory).
Solid State Drive	SSD WD Green M.2 120GB SATA + WD Green 240 GB 2.5 SATA.
Operation System	Installed Windows 10 Pro 64-bit (10.0, Build 17763).

**b) Smartphone**

- i) iPhone Operating System IOS with specifications:

**Table 3.13.1.2 (ii): The Smartphone Characteristics**

Specifications	
Operation system	IOS (Pie)
Processor	Apple All Bionic
Ram	2 GB of RAM, 64 GB of ROM
Screen	IPS LCD Screen 4.7 inches with 1080 x 2160 pixels, 18:9 screen ratios (~403 density)

ii) Xiaomi Redmi Note 5 AI Blue with specifications:

**Table 3.13.1.2 (iii): The Smartphone Characteristics**

Specifications	
Operation system	OS Android Pixel Experience 9.0 (Pie).
Processor	Chipset Qualcomm Snapdragon 636 (14nm) CPU Octa-core 1.8 GHz Kryo 260, GPU Adreno 509.
Ram	6 GB of RAM, 64 GB of ROM.
Screen	IPS LCD Screen 5.99 inches with 1080 x 2160 pixels, 18:9 screen ratios (~403 density).

**c) Software**

To develop a digital comic a suitable software/application programs to create the digital comic has been chosen which are:

- i) Adobe Photoshop CS6.
- ii) Flipbook Pro.

**Table 3.13.1.2 (iv):** The Function Setup of the digital comic

Software	Functions
Photoshop CS6	<ul style="list-style-type: none"><li>i. Sketching and drawing a character using the Onion skin feature.</li><li>ii. Paint bucket tools for paint interface.</li><li>iii. Design interface and background</li><li>iv. Font tools.</li></ul>
Flipbook pro	<ul style="list-style-type: none"><li>i. Converting jpeg to pdf image flip.</li><li>ii. Configure button for link navigation.</li></ul>

### **3.13.1.3 Design Phase**

The design phase was a follow-up after the analysis phase. In design phase, the comic design is determined based on the chosen topic in PQS textbook namely Pengajian Hadith. The planning of the script and storyboarding has been built by creating a character and characteristics, and then continuing with making sketches of comics images on paper.

#### **3.13.1.3.1 Script Making**

At this stage, the story ideas and the scripts were written based on the curriculum textbook of PQS subject for Form Five, which focused on the topic of Pengajian Hadith. The topic chosen is about the concept of *niat*.

#### **3.13.1.3.2 Character Design**

Character design was a process of changing the applicable characters and characteristics through visual and hand sketches grounded on a script. Character delineation is grounded based on the content of the topic of Pengajian Hadith contained in Form Five PQS subject. In addition, Islamic characters, places and major structures as well as the props had been drawn up to suit with the subject and the way the story was framed. A detailed study of visually drawn characters involved, costumes and social

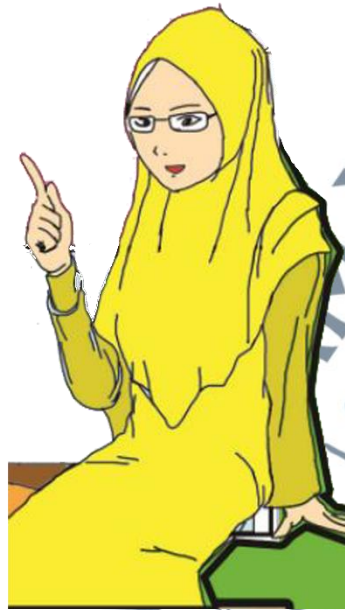
conditioning. The figure below are some exemplifications of visual sketches of characters and characteristics.



Student 1: Siti Nur Athirah



Student 2: Muhammad Zaki



Siti's sister

### 3.13.1.3.3 Storyboard

The storyboard was a graphic representation of the purpose multimedia project. It is an extension of the ideas presented in the script. It's also allowed to visualize how the final product is going. Besides, it's provided an overview of the project, demonstrate the arrangement and functionality of the program elements, and help delineate the program's navigation scheme. It's so importance to look and operate, which can help ensure that no vital information is left out during the development process.



Figure 3.13.1.2 (i): Sketch & Storyboard



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AYSIA

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Figure 3.13.1.2 (ii): Sketch & Storyboard

### **3.13.2 Production**

It's a stage where once the story is set, the designs are done and models created, actual production can begin. Followed by the texturing process, character rigging, animation layouts for previews and animation moves according to the timings of the layouts that have been made, lighting and rendering and visual effects. At this stage, the development phase was started to process.

#### **3.13.2.1 Development Phase**

In the development stage, all the elements such as graphics and text are organized and developed according to the design planning as explained in the design stage. The making of digital comics is carried out in accordance with the storyline and the designed image sketches. The image sketch was scanned to convert the image from the A4 paper into digital form. After that, the sketch results were edited on the computer by using the Adobe Photoshop CS6 application such as inserting graphics, text, images and backgrounds. Finally, the final comic was combined by using Flipbook pro to make it into complete digital form. The digital comic was made as attractive as possible, consisting of a cover page, opening part, comic content, and closing part.

##### **3.13.2.1.1 Image scan process**

At this phase, after thickening with a drawing pen, the image was scanned. Then, the Canon Scanner for Windows was used to transform into a digital image.



Figure 3.13.2.1.1 (i): Canon Scanner

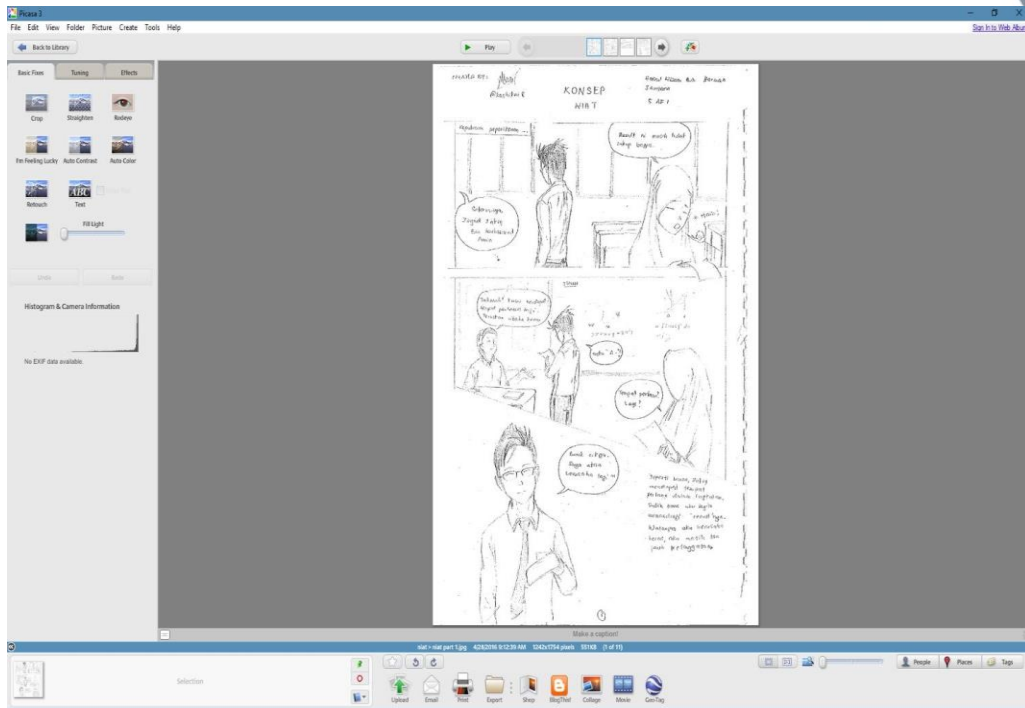


Figure 3.13.2.1.1 (ii): Computer scan result

### 3.13.2.1.2 The process of colouring comics

After the sketches were scanned, the editing process was done by using the Adobe Photoshop application. The activities carried out during the editing process include coloring, filling out the dialogue inside the word balloon based on the script, colored background, adjusting images, and inserted comic symbols.



**Figure 3.13.2.1.2:** Image colouring using Adobe Photoshop program

### 3.13.2.1.3 Digitization process

After editing part was done, the final process in making comics was preparing and finishing by compiling those pages into digital. In preparation for digital comics, there were several files joined into digital. Storylines of the comics, menu, buttons from the Adobe Photoshop CS6 software are exported into the Flipbook pro program in this application.

The Flipbook pro application was used to assist the preparation and finishing of comics to ensure the delivery of digital comics is continuously moved appropriately. At the final phase of development process, the comic was compiled by using this software to produce the complete digital comic. Moreover, this digital comic can be displayed both laptop and smartphone.



**Figure 3.13.2.1.3 (i):** The initial appearance of the Flipbook Pro application displayed on the laptop.



**Figure 3.13.2.1.3 (ii):** Display after entering the next page

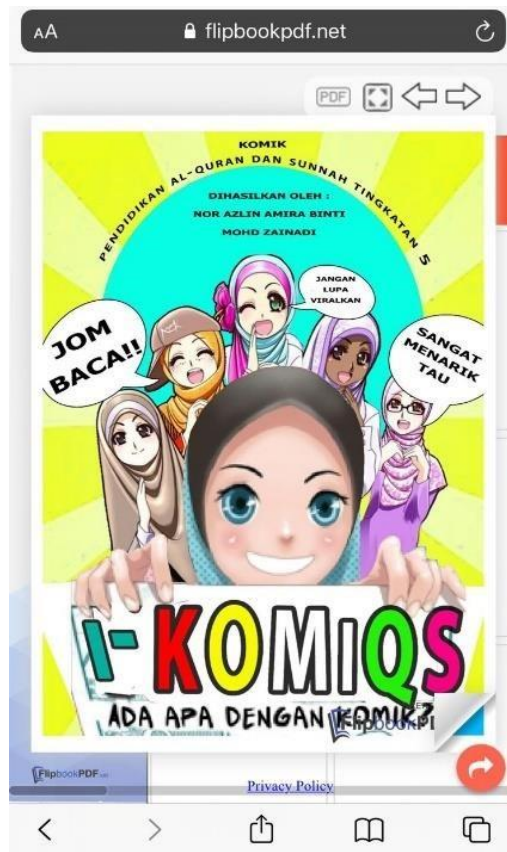


Figure 3.13.2.1.3 (iii): Smartphone initial display



Figure 3.13.2.1.3 (iv): Displayed material on Smartphone

#### 3.13.2.1.4 Making the interface

The features of the digital comic can be seen as follows;

##### a) Front Page

Front Page was the main page displayed before entering the next page. The illustrations group of students were illustrated as well at the front page.



**Figure 3.13.2.1.4 (i):** Front page of a digital comic

b) Flip button

Left and right buttons can be clicked to move into the next page or back into the previous page of the comic.

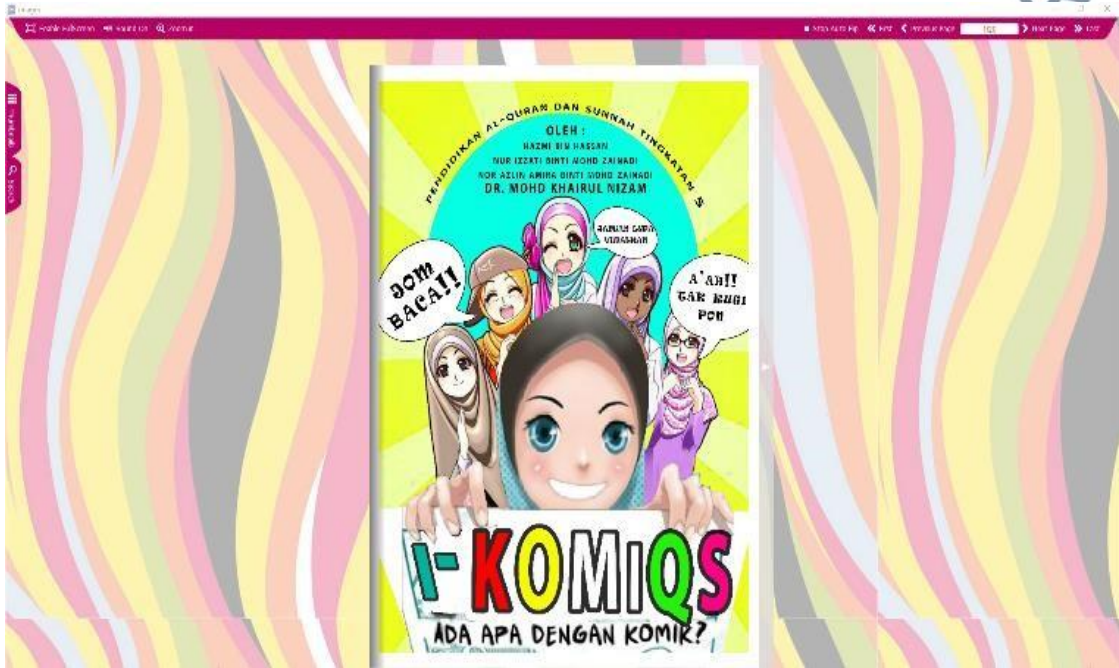


Figure 3.13.2.1.4 (ii): Flip button function

c) Enable Full Screen

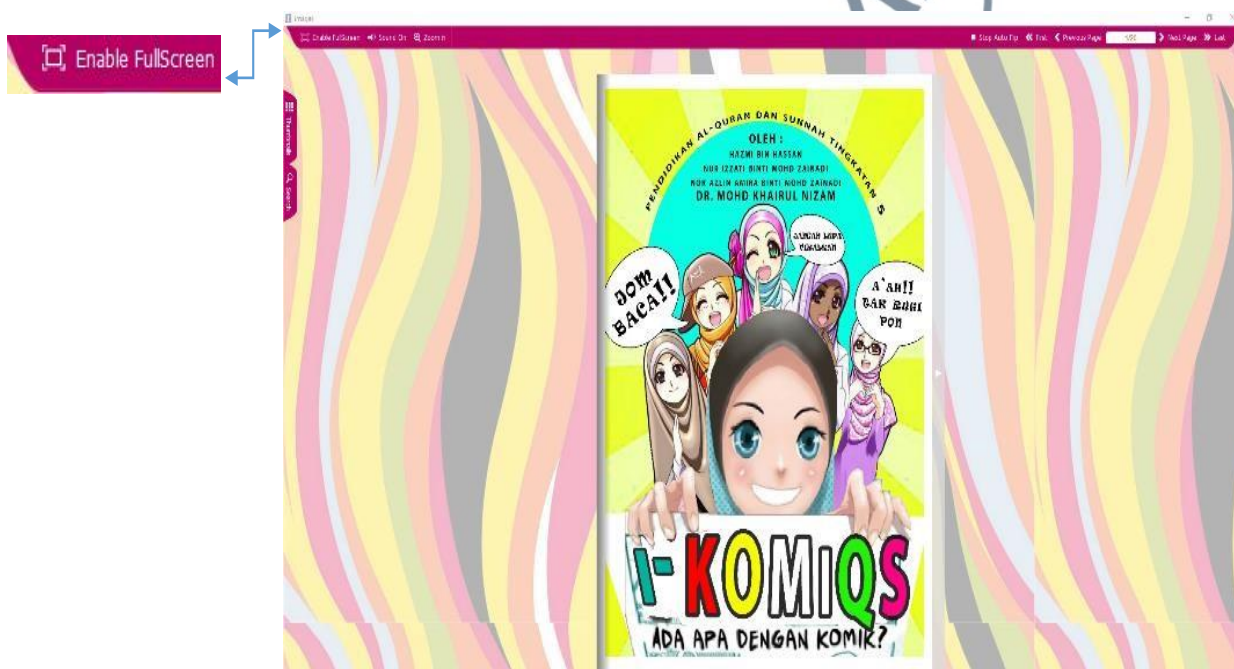


Figure 3.13.2.1.4 (iii): Enable Full Screen function

d) Sound on



Figure 3.13.2.1.4 (iv): Sound on function

e) Zoom in



Figure 3.13.2.1.4 (v): Zoom in function

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f) Auto flip



Figure 3.13.2.1.4 (vi): Auto flip function

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g) Previous & Next Page

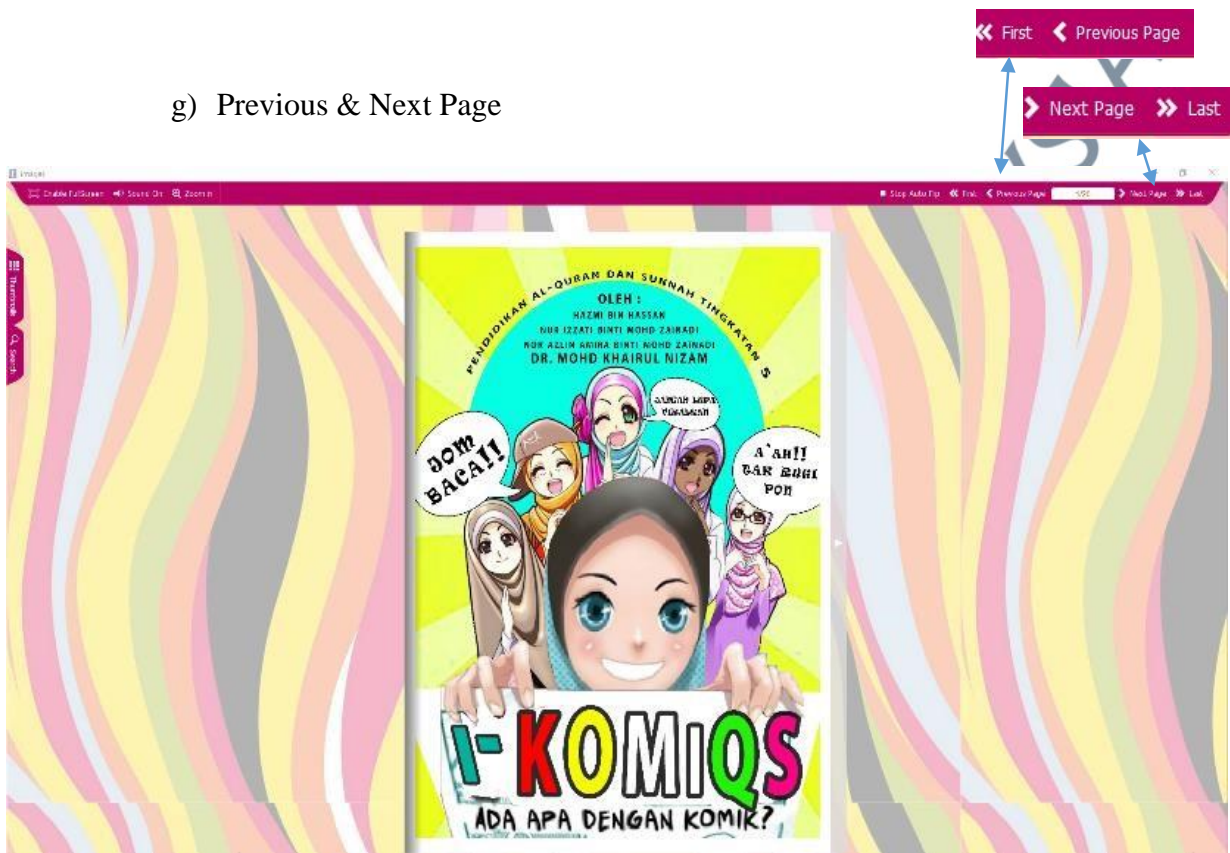


Figure 3.13.2.1.4 (vii): Previous & Next Page function

## h) Thumbnail



Figure 3.13.2.1.4 (viii): Thumbnail's function

## i) Contents

The contents explain based on the topic of Pengajian Hadith. This comic stories about a girl student named Siti Nur Athirah who was unsatisfied with her exam's result. She felt jealousy towards her classmate named Muhammad Zaki on his achievement result. She was disputed and feeling sad. After returned home, her sister saw her being sad for so long in her bedroom. Her sister then asked her to talk about what she felt, after she explained then her sister told her the story about the role of intention (niat).

Her sister explained about the hadith that Narrated from 'Umar bin Al-Khattab: "The reward of deeds depends upon the intentions, and every person will get the reward according to what he has intended. So, whoever *emigrated for worldly* benefits or for a woman to marry, his emigration was for what he emigrated for." (Sahih Al-Bukhari:1)

After that, she corrected her intention to study not just for the pursuit of success only and compete with other human beings but for the sake of Allah swt.

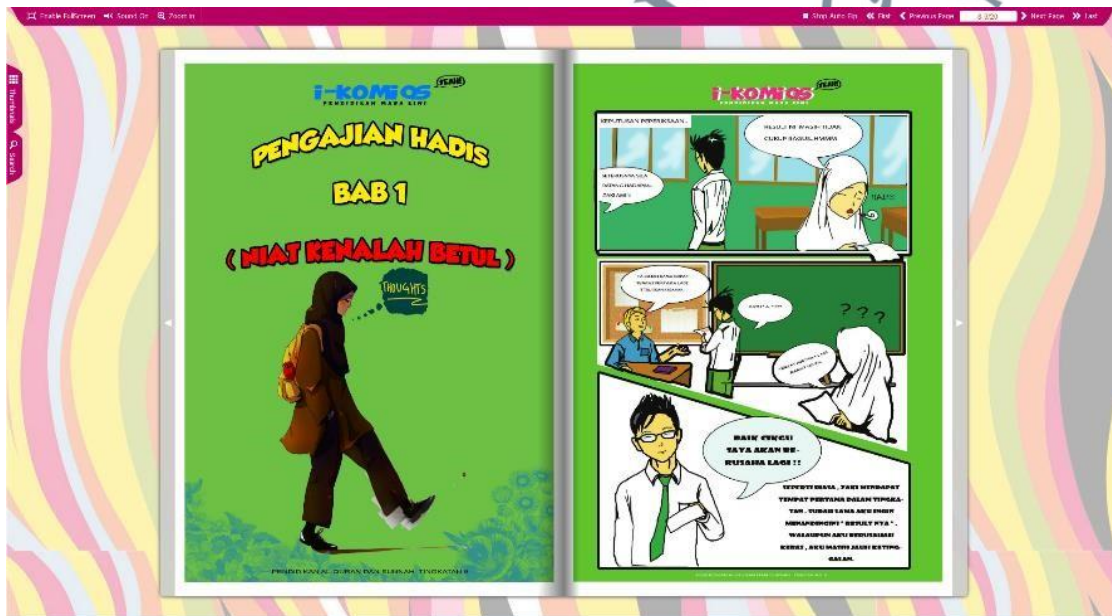


Figure 3.13.2.1.4 (ix): Contents 1

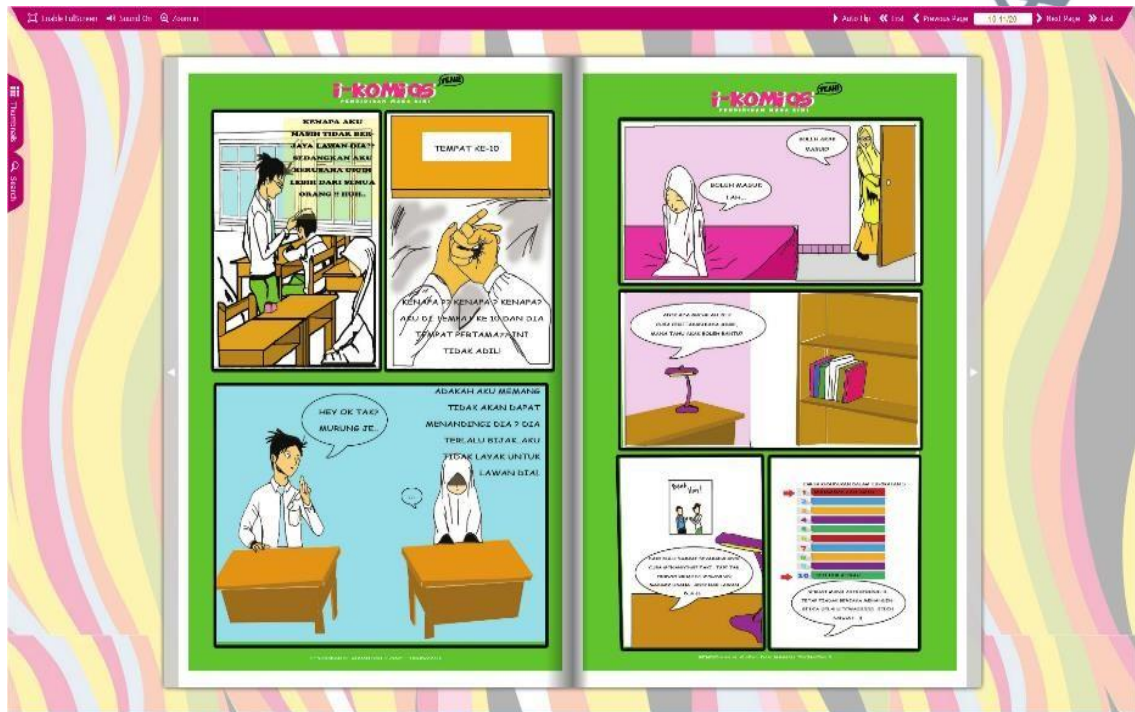


Figure 3.13.2.1.4 (x): Contents 2

### 3.13.3 Post-production

It's the stage where the animation results from the production stage are combined in the compositing process such as giving additional effects, color correction, audio giving, and finalization to become a final animation product. After the final process digital comic was done, the implementation phase and evaluation phase were applied to test the usability of the digital comic.

### **3.13.3.1 Implementation Phase**

The difficulties to implement this study due to pandemic, user testing and evaluation have been carried out during online learning session. The user testing and evaluation has been done on the 23rd of May 2022. The target audience consisted of Form 5 Ibnu Rusyd students of SMA Al-Ihsan, Kuantan Pahang. Before starting the evaluation, students were given a brief explanation about the project and the objectives of the testing being done by their teacher, Ustazah Fairuz Adibah. Once they understood, the digital comic was given through the link provided and they were asked to test the application.

After they have completed testing the applications, they were asked to fulfill the questionnaire that comes in google form. Informal interviews and discussion with the students in WhatsApp group were conducted after the post-testing in order to gather a data and to know more about the students' personal opinions, difficulties, preferences and experience while using the digital comic.

### **3.13.3.2 Evaluation Phase**

The evaluation phase was the stage to improve the result of the development product. Improvements are made starting from the development phase based on criticism and suggestions from students' responses. Based on criticism and suggestions from students, it was found that the usability of digital comic media that had been developed is still need improvement. Students' suggestions and criticisms include using language/terms in learning that students still do not understand, such as trimming,

grading, and conveyor belts. In addition, writing the word size according to the students is too small and using regional languages that are deemed unnecessary.

### 3.13.3.2.1 Testing

At this final phase, a testing also has been conducted to determine whether the functions contained in the application after the editing process could run properly. It aims to find flaws or errors that must be corrected. If the function is having problems, it can be fixed to obtain expected results. As a result, the test of digital comic was in good condition and can clearly run-on Smartphone/Laptop device.



**Figure 3.13.3.1.1 (i):** Laptop Interface Testing

**Figure 3.13.3.1.1 (ii):** Smartphone

Testing

