College Students' Data Management Skills in a Private University in the Philippines

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Abstract: The society could be understood through data around us. Hence, each individual must be equipped with knowledge and skills in managing data. This study aimed to describe data management skills of the college students. It made use of a mixed method of the qualitative and quantitative type of research, particularly descriptive approach. The study was conducted in the undergraduate schools of Saint Mary's University at Bayombong, Nueva Vizcaya, Philippines. The data management skills assessment is a researcher-made questionnaire that intended to measure the ability of senior students to properly handle data for easy access like sorting or arranging and coding. Findings revealed that most of the senior students were moderately skillful in managing data. It suggests that the data management skills of the students are not yet fully achieved. Hence, data management skills should be taught as much as writing or computational skills are taught because of the importance it plays in the society.

Keywords: Sorting, Filing Management, Handling Data, Record Keeping, Coding, Organizational Skills

1. Introduction

Data management allows for a better organization of records and documents. Accordingly, Whitlock, McPeek, Rausher, Rieseberg and Moore (2010) stated that at the center of understanding the natural world are data, but that most of the data collected are very quickly lost after they are collected. Citing Michener Brunt, Helly, Kirchner, and Stafford, (1997) he affirmed that once the results of a study have been published, "The data on which the results are based are often stored unreliably, subject to loss by hard drive failure and by the researcher forgetting the specific details required to use the data".

Data management also refers to filing management. According to Nelson (2005), there are many forms of file management depending on the size and longevity of the firm, areas of practice, available technology, and local standards of care. Moss (2012) for instance stated that government files and the system that preceded their introduction have been eclipsed by the introduction of electronic record system. He further stated that this has been accompanied both by a marked deterioration in record keeping practices and the use of record keeping enabling an audit culture. He explored what those charged with integrating digital records into the archives might learn from record keeping practice in the paper world.

With regards to records keeping, Radford (1983) mentioned that there are two types of user failure in the library. These include the user who cannot find the wanted item in the library catalog, and a user who is unable to locate the items on the shelves even if those were found in the library catalog. With these observations, he conducted a case study about failure in the library. He interviewed a total of 2,991 persons and the overall failure rate was 35.9 percent. He added that failure rate at the catalog was 26.2 percent and a failure at the shelf was 46.1 percent. Furthermore, the study revealed that user errors contributed to more than half of the failures.

The study of Merlone (2005) categorized student data according to how personal and stable the information is and suggested clear-cut protocols for the storage, access and destruction of these data. The study which used interview with school counselors other that literature review and research on school and mental health laws and policies, found that there is an inherent confusion with the fact that there are laws and guidelines for school records that do not include counselors' files. Hence, issues regarding the retention of notes kept by counselors fall into an ill-defined area.

Kerr and Zigmond (1986) as cited by Bakunas and Holley (2004) stated that organizational skills are crucial for student success in school. Hence, they stated that organizational skills should be taught as much as writing or computation skills are taught. Studying organizational skills and student achievement, Davis (2007) examined whether exposing students with mild disabilities to strategies that reinforce organizational skills would have any effect on student achievement. The results of the study included test scores and general responses from interview questions asked of participating teachers and students within the target group. After the study was conducted with ten students who had mild disabilities, it was found that students within the target group that were given the note-taking strategy had higher overall scores then those who did not receive that strategy. It therefore, concluded that educators should have a strategy that will help them in their organization to prepare and make students better organized as well.

Cejovic (2011) on the other hand, examined the potential relationship between organizational skills and self-motivation and how that relationship might help to increase the importance of making organizational skills an indispensable element of elementary school curricula. These mixed-methods, pretest/posttest case study examined a classroom of 23 fifth-grade students in a suburban Chicago public school in order to gain a deeper understanding of student organization and the effect it might have on student ability to self-motivate. The study found that there was a statistically significant difference in the organizational abilities of highly motivated students and their moderately and poorly motivated counterparts. Over the course of pre-intervention and post-intervention measures, it was discovered that roughly 98% of the students had improved their organizational skill as a result of the intervention. The same data sources revealed that students also began to make small improvements with regard competence, relatedness and autonomy, implying that motivation was improving as well. Moreover, the study of Brous, Janssen and Vilminko-Heikkine (2016) found that managing data appropriately would be used to develop an effective data governance strategy and approach. Meanwhile the study of Bonanni, Gunton and Czehut (2014) found that data management can be a basis for decisions that can aid in improvement particularly in schools.

Given the above studies, it is noteworthy to mention that "making sense of data and dealing with uncertainty are skills essential to being wise consumer, and enlightened citizen, and an effective worker or leader in our data-driven society" (Scheaffer, Tabor, & Hirsch, 2008).

Thus, students need to be prepared also for a data-driven workplace. As mentioned in the article of Satell (2014) higher education system seems to struggle to keep up in terms of preparing students for this big data. Moreover, it was also stated that the problem is that there aren't enough people with data skills. Johnston and Jeffryes (2013) found that despite of the need of data management skills particularly by the graduate students in structural engineering, the data management skills were not covered as important educational needs. Hence, this study aimed to determine the level of data management skills of the college students in a private school in the Philippines. This study can be a basis to reveal if the students are equipped with necessary data management skills they will need in their workplace and to come up with recommendations or possible actions to improve this skills. Besides, Henty (2015) said that researches with strong data management practices combined with other skills such as ability to use emerging facilities and tools, will also have skills to make available data for business, education or for broader community.

2. Methodology

2.1 Research Design

This study used mixed method of qualitative and quantitative type of research. Descriptive approach was used. Data management skills were measured through open ended problems in a form of tasks or situations. Hence, these were answerable by qualitative data. The qualitative responses of the students were quantified based on some criteria.

2.2 Research Environment

The study was conducted in the undergraduate schools of Saint Mary's University at Bayombong, Nueva Vizcaya, Philippines.

2.3 Respondents of the Study

There were 520 students who represented the population of the study. However, only 173 students positively responded to be part of the research study. The students were fourth year students who were enrolled in thesis writing subject. Data management skills for a student writing research is very essential to finish his/her research paper.

2.4 Instrumentation

The data management skills assessment is a researcher-made questionnaire that intended to measure the ability of students to properly handle data for easy access like sorting or arranging and coding. The data management skills questionnaire underwent factor analysis. There were two factors constructed. The first factor/component index is sanitizing and summarizing the data while the component 2 index is arranging files in data management skills. The loadings ranged from 0.638 to 0.872, with strong positive loadings. Interraters' reliability was computed using Krippendorff's alpha (Hayes & Krippendorff,

2007). The result showed that the inter-coder / inter-rater reliability in each item of data management skills ranged from 0.9585 to 9857 respectively.

Table 1: Krippendorff's Alpha Result on Inter-raters' Reliability

Problem Number	Alpha
Problem 1	0.9857
Problem 2	0.9585
Problem 3	0.9824
Problem 4	0.9725

2.5 Data Gathering Procedure

The following were the procedures done to gather the data required in the study:

1. The instruments used in this study underwent pilot testing. Possible answers of the respondents were obtained for open ended questions.
2. The data management skills questionnaire underwent factor analysis.
3. The final instruments were given to the senior students during the second semester, School year 2016-2017. All senior students enrolled in research subjects were invited to take the assessment instruments but only 173 students positively responded in the conduct of the study. The data gathering took place last November 26, 2016 at Apo Pilo building, Saint Mary's University.
4. There were two external inter-raters who assessed the outputs of the students in data management skills. The inter-raters evaluated the rubrics used in checking the answers of the respondents before they rated the responses of the students. Selected outputs were also scanned to support the statistical table presented to answer the research problems. The names of the students or respondents were fictitious. The qualifications of the inter-raters are described below. Qualitative inter-raters: One of the qualitative raters is both a licensed Psychometrician and registered guidance counselor. Both of qualitative inter-raters are seasoned researchers on qualitative and quantitative researches. They are also master's degree holders.

2.6 Treatment of Data

To describe the individual learning outcomes in terms of data management skills, the responses of the students were assessed based on the prepared guide (Table 2). All responses in each of the four given items underwent open coding. Responses were analyzed to identify the method and the category that describe the students' action when tasked to manage their data. After open coding, axial coding was subsequently performed for scoring purposes. When multiple answers were given, the total score was considered but would not exceed the perfect score for each item which is five. Finally, the scores in all items were summed up and were converted to percentage score using the formula:

$$\%\ score = \frac{x}{total\ score} x100\%$$ where x is the score.

The data management skills were described using the scale for interpreting result of data management skills found in Table 3. The individual results were presented using frequency counts and percents. Table 2 shows the guide for scoring data management skills.

Table2: Guide for Scoring Data Management Skills

Description	Scoring
Description is complete and it can provide the data asked.	5
Process described is a possible way but there will be few problems encountered.	3
Process is a preliminary method of managing of data and will result to major problems.	1
Not possible process and/or initial method or very general method that cannot answer what is asked.	0

Table 3 shows the scale of interpreting the results of data management skills.

Table 3: Scale for Interpreting Result of Data Management Skills

% Score	Description
0.00 – 19.49 %	The respondent is not skillful. His data management methods are not possible processes or very general methods; the data are not properly handled. They are not sanitized, summarized and arranged into order for easy access.
19.50 % - 39.49 %	The respondent is slightly skillful. The management methods are preliminary only and will result to major problems in accessing the data. The data are slightly sanitized, summarized and arranged into order for easy access.
39.50 % - 59.49 %	The respondent is moderately skillful. The management methods are possible ways, however, they are only for limited numbers of files. The process will result in minor problems in accessing the data. The data are moderately sanitized, summarized and arranged into order for easy access.
59.50 % - 79.49 %	The respondent is skillful. The management methods are possible ways; however, few problems are possible. The data are sanitized, summarized and arranged into order for easy access.
79.50-100%	The respondent is highly skillful. The management methods are best possible ways. The data are sanitized, summarized and arranged into order for easy access.

Tables 4 to 7 show the open coded memo for problems 1 to 4. Table 4 shows the memos, category, method, problem and assigned points for students' answers in problem 1.

Table4: Open Coded Memo for Problem 1

Memos	Category	Method	Problem	Assigned point/s
The data gathered will be encoded and saved.	Technical method	Save Encode Make notes	These are processes that describe what to do to prepare it for analysis.	0
To ask help from instructors, advisers or other experts /knowledgeable in case of problems encountered.	Assistance	Seek help	The problem will be solved; however, no data management skills were performed by the individual.	
To review data in case of error committed in encoding, there is a need to keep original copy, to save it in different storage both offline and online or soft and hard copy.	Access on original or raw data	Back up	The solution given is to have access to the original raw data but it did not answer which among the available data will correct the mistake	1
To check misspelled words, grammar and other clerical errors committed, use autocorrect function.	Clerical error checking	Autocorrect	Only clerical errors will be checked like spacing, period, misspelled words and clerical errors but the other wrong data cannot be checked. Some mistakes can only be checked.	
The data will be encoded in the computer program like IBM SPSS and Microsoft office.	Use of computer programs	Use of IBM SPSS, Microsoft Excel and Microsoft Word	The method of using program is one way to determine errors committed if familiar with functions or processes that the programs can perform.	
To encode the data accurately by checking data while encoding, doing the whole process again for second time, reviewing or going over the	Accuracy	Encode Accurately Recheck	Method could lead to a small chance of committing error but it is time consuming especially if you will go over the	3

Memos	Category	Method	Problem	Assigned point/s
data.		Tallying Review	whole process. In case errors were still committed, how to determine access to the data with mistakes is not solved.	
The data need to be organized by sorting, arranging based on categories set, summarizing and using tabular form of presentation.	Organizing	Sort Arrange Summarize using table	This is a possible way to determine the error because if the responses will be organized, scale of answer not in the options will be determined but it did not answer how to determine new data with error. How to access the questionnaire for review?	3
For easy review of data in case some errors were committed, assign number to the questionnaires	Assigning number	Organize the data and assign number	If errors were committed and identified, you can review and go over the responses by going back only to the questionnaire of the particular respondent traced through his/her assigned number. Answer is direct to the point.	5

Based on open coding, memoing was done through consolidation of all memos and categories were generated based on the responses given by the students. Assessment of problems that could possibly be encountered was also considered before the final assignment of points. Table 5 shows the open code memo for problem 2.

Table 5: Open Coded Memo for Problem 2

Memos	Category	Method	Problem	Assigned points
Arrange the file in organized manner.	Organized	Organize Proper means	Method is very general and cannot describe particular way on how to access	0

Memos	Category	Method	Problem	Assigned points
			individual grade.	
Create folder with file name that can easily be remembered and accessed	Access to the data	Arrange files Save in students' grade folder Access using File name Title easily remembered Use grade of my students as file name Naming folder Arrange files	The method will only provide access to the data but cannot describe how to locate grade of individual student in case he asked	1
Arrange the scores/grades according to recency	Chronologically arranged	Chronological by chapter by recency up to date	Cannot easily determine the grade of particular student without going over the whole data.	
Arrange the file according to particular categories. Example: Separate the folder of grades in first term, second term and third term.	Arranged by other category/ies	Arrange by term, section, year level, course, code and etc.	The method can only access particular data based on the set category however there is still difficulty in finding for a particular students 'grade	
Arrange the grade from highest to lowest or vice versa.	Arranged by grade	Arrange from highest to lowest. Arrange from lowest to highest	The need to go over the whole data is necessary to find out grade of one student	

Memos	Category	Method	Problem	Assigned points
		grade.		
Use of computer applications for easy access of the data.	Use of computer programs	Use of Microsoft Excel, IBM SPSS and other soft wares	Using computer programs is very useful if familiar to the function to locate. But, the method is effective only if the soft copy of the grade is available. The problem is if the only thing available is hard copy and the file is not well organized.	3
Arrange the surname of the students in alphabetical order together with their grades.	Alphabetically arranged	Alphabetically	Easy to locate the grade of a particular student.	5
Arrange the data according to the surname or last name of the students, organized by category. Example sex, code, course, etc.	Arranged by category and alphabetically		Easy to locate the grade of a particular student.	5

Table 6 shows the open coded memo for problem 3.

Table 6: Open Coded Memo for Problem 3

Memos	Category	Method	Problem/Reason	Assigned points
Arrange the books	Arranged	Arranged	It did not suggest any method of arrangement. The problem was not solved.	0
Arrange the books in order or properly.	Organized	In order Properly arranged	Too general method on how to make it properly organized or in order is not	

Memos	Category	Method	Problem/Reason	Assigned points
			mentioned.	
Arrange the books in alphabetical order based on title or author's name.	Alphabetically arranged	Alphabetically by title Alphabetically arranged by author	This method is effective only if few books are in a particular letter of the alphabet. The method is time consuming for a large number of books.	3
Arrange the books based on own preference like date of publication, frequency of use and others.	Grouped according to preference	by author	Since the arrangement is by grouping books of same authors but authors are not arranged alphabetically, problem to figure out the location of the book will still be encountered.	3
		by date of publication/ volume	Problem will be encountered if not familiar with the date of publication or if there are several books of the same publication and not sorted by any other category.	1
		by frequency of use and by schedule	Problems will be encountered if another person will locate the book since he/she is not using it or not the same schedule even if arrangement of books will be explained, then difficulty in locating books will be encountered.	1
		by size	This is good to look at only but it will cause difficulty in finding	1

Memos	Category	Method	Problem/Reason	Assigned points
			books. It will take time before the book will be located especially if one is not familiar with the size.	
Arrange the books by classification like type, subject, topic, section and others	Grouped by classification	By topic/subject/ section etc.	Problems will be encountered if several books belong to each classification.	3
Group the books by category such as by theme, type, section and others and arrange it alphabetically.	Arranged by category and alphabetically	Alphabetically organized by Theme/type; degree of interest; division/discipline, number; section; subject/topic; date of publication; category; size	It is easier to locate books if subdivided or grouped by categories and yet it is alphabetically arranged.	5
Use methods like Dewey decimal system or through catalog.	By catalog/Dewey Decimal System	Catalog, classification by catalog, Dewy decimal system	Method is used in the library.	
Group the books by category and then arrange the books by category/preference.	Grouped by 2 or more categories	Author and date of publication, Book series and type, Genre and date of publication, Subject and date of publication, Kind and author, Section and subsection	It is easier to locate if books are arranged by two or more categories.	5

Memos	Category	Method	Problem/Reason	Assigned points
		Number and size		
		Chronological and number	If assigned with number it is easy to access the book.	5
		Kind and size,	Difficulty will be encountered if he is unfamiliar with the size or not his favorite or not familiar with the color of the book.	3
		Content and size, Genre and size, Genre and according to favorite, chronological and size, topic and color	Problem to encounter if not familiar with size and not frequently used.	
		Frequency of use and size		1

Table 7 shows the open coded memo for problem 4.

Table 7: Open Coded Memo for Problem 4

Memos	Category	Method	Problem/Reason	Assigned points
To analyze and interpret the data gathered to present the summary.	Analyze and interpret	Read and review, analyze and explain, summarize, compile and read, evaluate the answer, provide guide questions, understand the stand, statistics process	The answer is too general. It talks about the process of coming up with what to present as summary but the task to provide the summary is not given.	0
To compute the average of the data gathered	Average	Compute mean	The data will only involve yes or no and can be supported by reasons but no average needed.	
The data gathered will be encoded/ written using Microsoft Word or excel in tabular or bulleted form	Encode/write/use of Microsoft Word/ excel/present in bulleted form or table form	Encode the data, write notes, use Microsoft Excel or word, present encoded data in bulleted form or tabular form	This is part of organizing data or preparing the data for analysis.	
To come up with summary, data must be gathered.	Gather data	Collect data, ask opinion, gather data	It is already given in the problem that data were gathered. It did not answer the question on how to provide summary?	
After the data were analyzed and interpreted, the result should be presented to give the summary.	Present result	Report the result	The given answer does not talk about how to show the summary instead, the manner of how	

Memos	Category	Method	Problem/Reason	Assigned points
			the result will be presented.	
Based from the responses, the data will be analyzed by selecting or extracting only the main idea.	Extract main idea	Get the main point, choose important information, combine main idea, get important words or thoughts, outline important details, point out most important	Part of analysis to determine the stand of each student.	1
Aside from the summary, reasons and evidences were also seen important.	Provide evidence/ support with reasons	Add significant views, support with details and opinions, support with evidences	This method will only support the stand of the students by their reason.	
To present the stand of pro death penalty and anti-death penalty be comparing the two views.	Compare views	Compare pro and anti	Comparing views will not give the summary of students' stand but more of their reasons only.	
All the responses of the classmates will be compiled.	Compile	Compile the data	This will only consolidate the responses of the students but summary is not yet provided after compiling.	
The responses of classmates will be written in essay form.	Present in essay form	Present opinions of pro and anti in essay	Reporting the result in essay form will give emphasis on the reasons of students' stand. It will appear to be comparative views of the students. It will be difficult to	

Memos	Category	Method	Problem/Reason	Assigned points
			determine the number of pro and anti-especially if not mentioned in the essay.	
Separate the group into two groups, the view of pro and anti-death penalty.	Grouped according to stand	Summarize pro and against,	This is just an initial step to determine the summary but the answers of the respondents are incomplete.	3
Combine the same ideas to come up with summary	Combine same idea	Compile same	This method can come up with summary of reasons and not summary of their stand. The method is initial step.	
The summary will be presented in frequency count and percentage to determine the number of pro and anti-death penalty	Frequency count or percentage	Tally, frequency count, percentage	This will present the summary of the students' stand.	5
The chart such as bar and pie chart will show the summary.	Chart	Bar, pie		

2.7 Results and Discussions

Table 8 shows the frequency counts and percents of the data management skills of the students working on quantitative research.

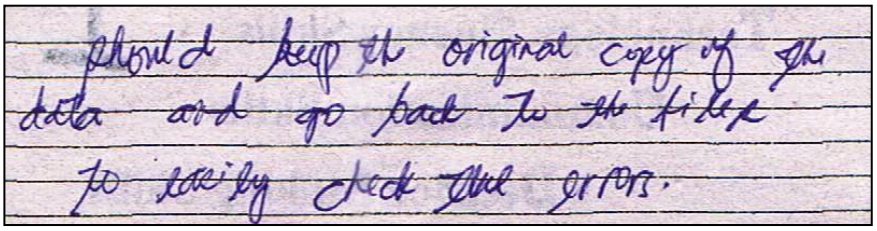
Table 8: Frequency Counts and Percents of the Data Management Skills of the Students working on Quantitative Research

Data management skills	Frequency	Count
not skillful	16	9.2
slightly skillful	27	15.6
moderately skillful	64	37.0
Skillful	50	28.9
highly skillful	16	9.2
Total	173	100.0

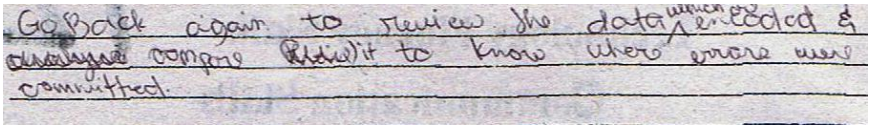
As gleaned from Table 8, the data management of the students varies from one another and some were not skillful while others were slightly skillful up to the extent of being highly skillful. Furthermore, sample responses in the questionnaire revealing the methods used by the students in managing their data in problem 1 to problem 4 are presented. The names of the students or respondents were fictitious.

Problem 1. Data gathered for analysis and interpretation need to be encoded. For easy review of data in case some errors were committed, what is the best thing to do?

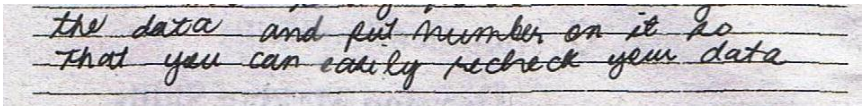
The scanned response of Trista indicating the data management skills highlighting the importance to access original or raw data is shown below:



Trista emphasized that to easily check errors the best thing for her is to keep the original copy of the data. This would assure that the available copy would be obtainable just in case something happens to the data or the possibility to go back to the original data. On the other hand, the scanned response of Janelle which is to make sure the accuracy of the data encoded is shown below:

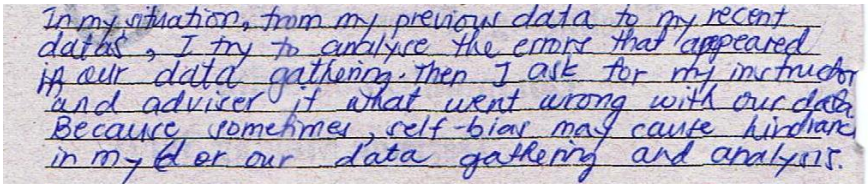


Janelle would review the data encoded and compare the data to determine the error committed. Other students even said that they would go over and start again or even re-encode the data just to make sure that these were accurately encoded which decreases the possibility of committing errors. Moreover, the best thing to do to recheck the error as mentioned by Kyle is arrange:

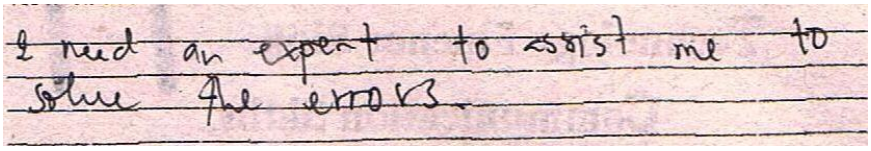


Kyle would assign number aside from arranging the data. It is just proper to write number to the data so that if an error were committed it would be easy to go back only to the particular data with error and not going over the whole data.

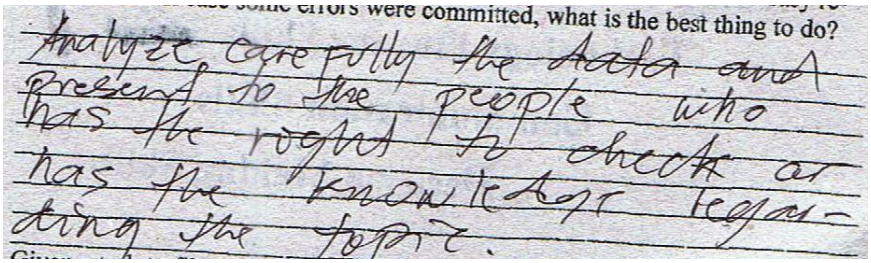
Some students would also seek assistance from other people to help them determine what to do in case errors were committed in their data. The scanned answers of the students reveal that they would ask assistance as shown below:



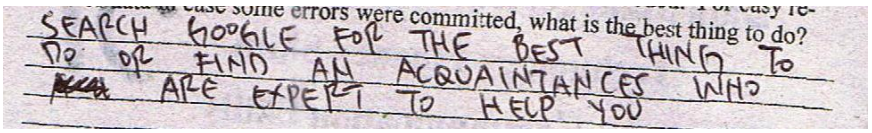
Tristan would ask help from his instructor and adviser:



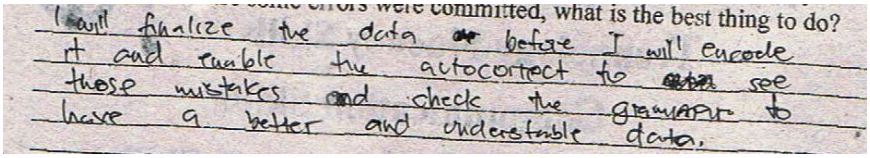
Troy would ask help from an expert to assist him:



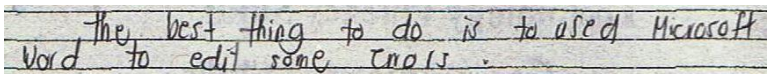
Abviel would analyze his data and look for somebody who is knowledgeable to help him, to wit:



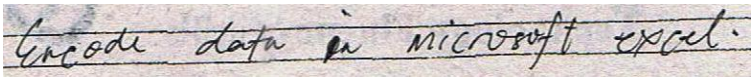
Chadly would search the internet to find what is the best thing to do or also ask his friends and other experts as illustrated. Asking assistance would be very helpful to determine what is the best thing to do but the student was not able to show his own way of solving the problem or reveal his data management skills. Students also understood the error as grammatical errors or spelling errors only and not errors in data like numerical value. Liam would check these kinds of errors using autocrrect function as follows:



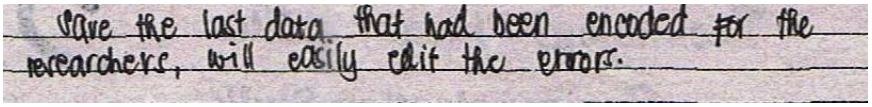
Liam would finalize his data and enable the autocorrect function so that clerical mistakes could easily be identified. Aside from focusing on clerical error checking, Michelle and Merz also mentioned the use of computer programs as shown in the following scanned responses:



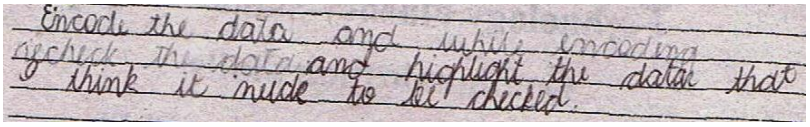
Michelle would use Microsoft Word in encoding her data because she believes that Microsoft Word was used to edit some errors. Meanwhile Merz also reveals another computer program:



Merz would encode her data in Microsoft Excel. Mariel and Weng would think of technical methods like saving, highlighting, and encoding. The scanned response of Mariel is shown below.

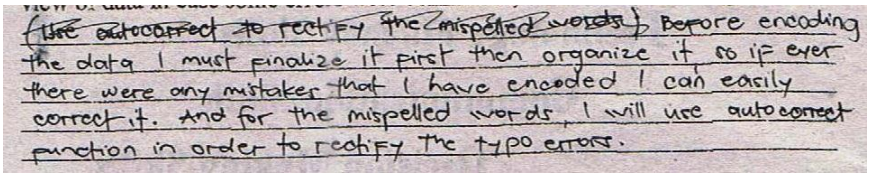


Mariel would save the data she encoded. On the other hand, Weng would do some technical methods like encoding and highlighting as follows:

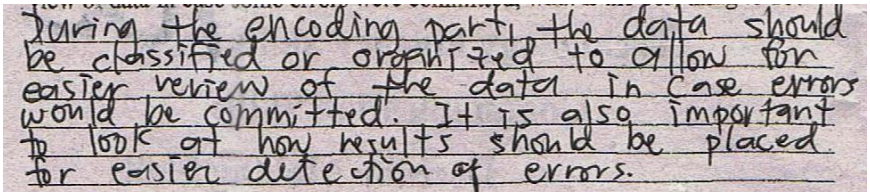


As shown in the scanned document, Weng would encode the data and place a mark by highlighting if she is not sure of the data she is encoding that need to be rechecked.

Odi also expressed that he would use the same method except that he mentioned more detailed explanations of the process that he would do. The scanned response is shown below:


I use autocorrect to rectify the misspelled words. Before encoding the data I must finalize it first then organize it so if ever there were any mistakes that I have encoded I can easily correct it. And for the mispelled words, I will use autocorrect function in order to rectify the typo errors.

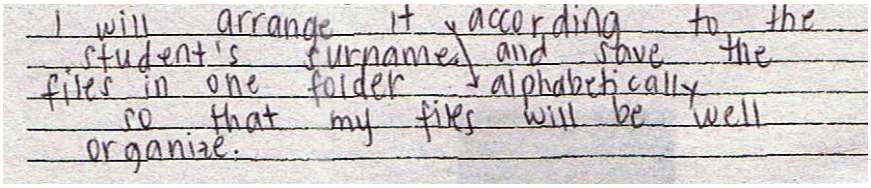
Odi would prepare the data first or finalize it by organizing so that it would be easy for him to correct errors. Misspelled words would also be considered with the aid of the autocorrect function. There were also answers that would not give any particular way of organizing the data as shown in the scanned response below:


During the encoding part, the data should be classified or organized to allow for easier review of the data in case errors would be committed. It is also important to look at how results should be placed for easier detection of errors.

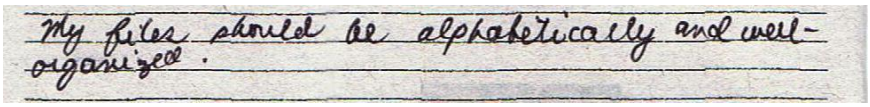
The idea behind Norma's answer is to organize the data for easy review if errors were committed but she did not cite a particular method on how to organize the data.

Question 2: Given a task to file students' grade, how will you arrange your file?

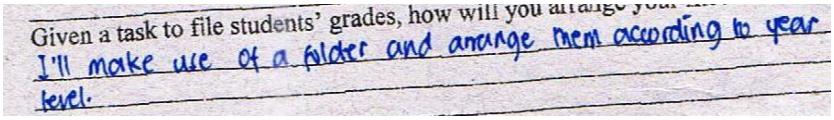
The following scanned responses show that students would think of saving the data in one folder so that they would have access to the data. The names of the students or respondents are fictitious.


I will arrange it according to the student's surnames and save the files in one folder alphabetically so that my files will be well organize.

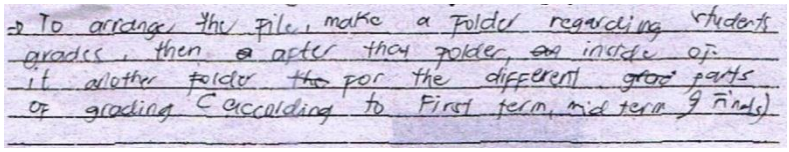
Alvin mentioned that he would save his file in one folder so that it would be well organized but this would also show that he would like to access his data in case he needs it. Aside from organizing the data, Madel mentioned arranging files alphabetically as expressed below:


My files should be alphabetically and well-organized.

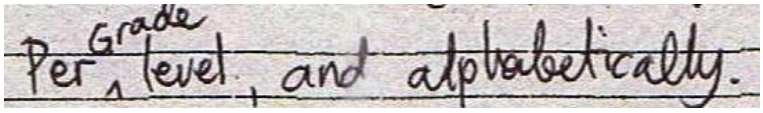
Madel would arrange her file alphabetically and organize it well. This is the common practice in the listing of students. If not, others also would arrange by category. On the other hand, Majo revealed another method of arranging students' grades:



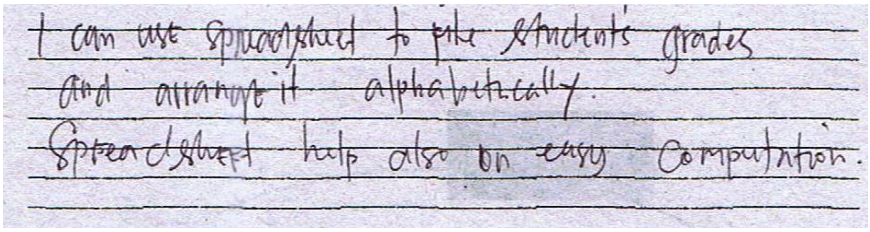
Majo would make a folder and arrange the grades according to year of the students. Other categories could be based on students' sex, department, course, age and other categories related to students. Allan would arrange it chronologically as shown in the scanned response below:



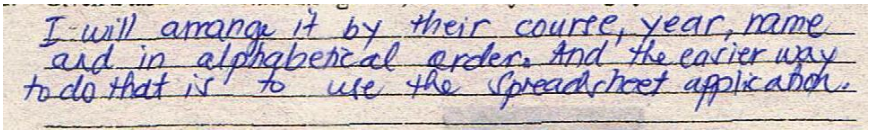
Allan would arrange the file by folder and subfolders for the different grading according to first term, second term and third term. Others would arrange by topics or chapters. Malou would also consider arranging by category but the names will be arranged alphabetically as shown in her scanned response.



Malou would arrange the file per grade level and alphabetically. Meanwhile, students also considered the use of technology such as computers as illustrated in the answer of Jess:



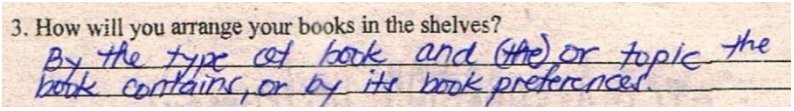
Jess answered that he would use spreadsheet to file the students' grades and also arrange the names alphabetically. He also mentioned that spreadsheet helps with easy computation. The scanned response of Onad shows a multi method:



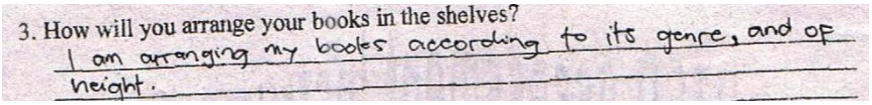
Onad showed that in arranging students' grades, he would do it by categories such as course, year, and name and in alphabetical order. He would also use computer particularly spreadsheet application for him to possibly do the sorting.

Question 3: How will you arrange your books in the shelves?

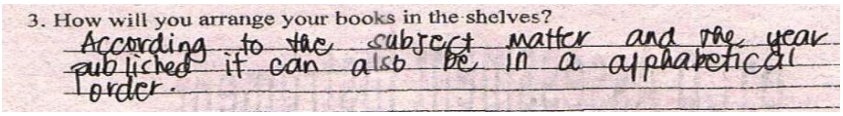
Meanwhile, the scanned responses below display how the students will arrange their books in the shelves. The names of the students or respondents are fictitious.



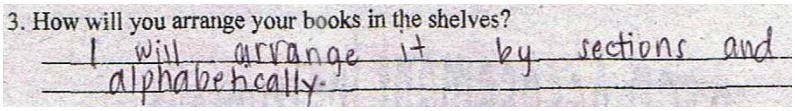
Marilyn would arrange her books in two or more categories such as type and topic or book preference. Other categories would include the response found below:



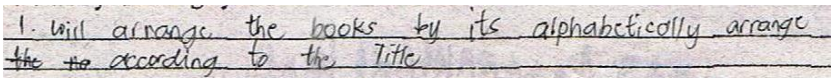
Majo would consider genre and height in arranging her books. Aside from that, the scanned response of Lyn indicates that books would be arranged by category and alphabetically.



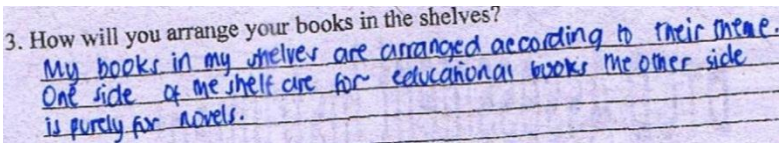
Lyn would arrange her books according to the subject matter and year published but the books would be arranged alphabetically. However, she did not mention what would be her basis in arranging it alphabetically. Similarly, Afton shows the same arrangement but different category.



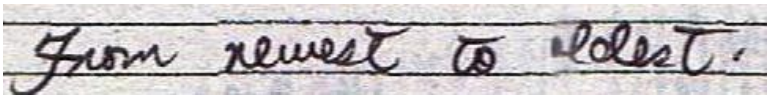
Afton would arrange the books by sections and alphabetically. Janelle would also arrange the books alphabetically only as shown below:



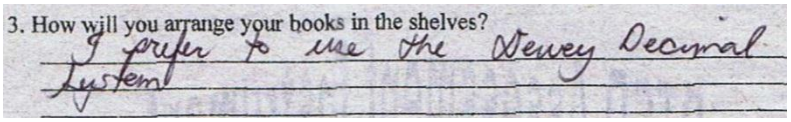
Janelle would arrange her books alphabetically. It could be by classification as illustrated below:



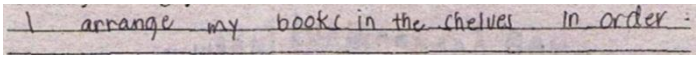
Carding would use themes in arranging her books like educational books are put together while novels would be placed purely also on one side of the shelves. The books would also be arranged by preference as shown below:



Mia would arrange her book from newest to oldest. It could be based on date of publication or date bought or latest edition. Some students are also familiar with Dewey Decimal as indicated in the response below:



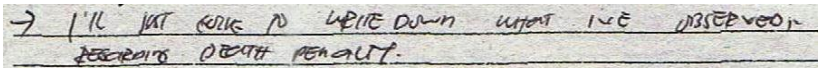
Enrique would use Dewey Decimal System in arranging his books in the shelves. This system is used in the libraries. Students also responded that they would organize their books however no particular way was given as follows:



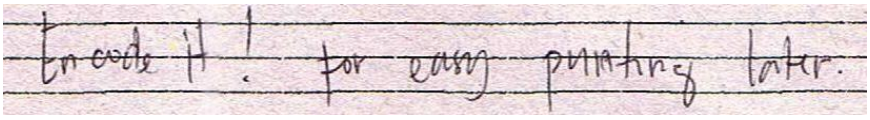
Mike would arrange his book in the shelves in order but he did not reveal the arrangement of his book in the shelves.

Question 4: You were given a task to provide summary of your classmates' stand regarding issue on death penalty, what will you do to give the summary after surveying the answer of your classmates??

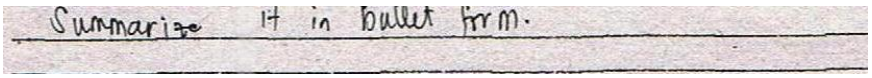
The scanned responses of the students on what to do to summarize classmates' stand on death penalty are shown below. The names of the students or respondents are fictitious.



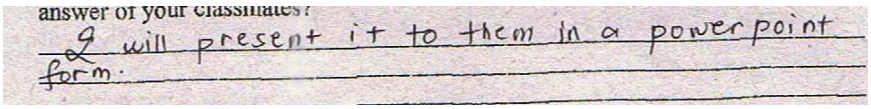
Kate would gather the data by observation. However, Kate did not mention how she would process the gathered information. The scanned response of Doming is shown below:



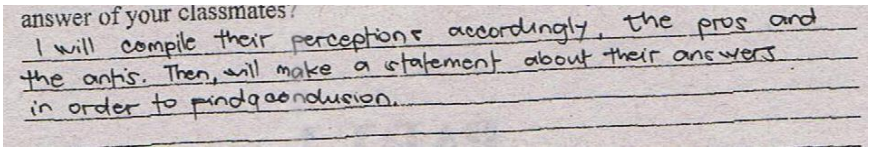
Doming would encode the data and he was thinking of printing the result of his data in order to have a hard copy. But still he did not give manner of summarizing his data. Lyra answered how she would encode the data gathered as follows:



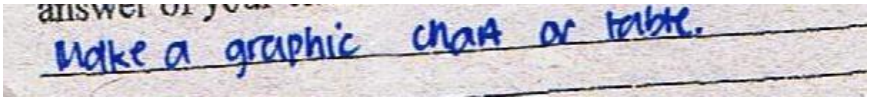
Lyra would present her data in bullet form but what to include in her written data was not revealed. In the succeeding scanned response, JM answered that he would present the result.



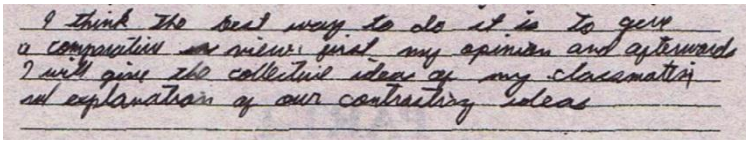
JM would present the classmates' stand on death penalty in power point, but what he would present as a summary of classmates' stand was not revealed in his answer. Ruby's scanned response is shown below:



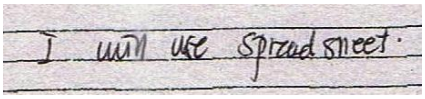
Ruby would compile the responses of her classmates by combining same ideas or combining same stand, pro and anti-death penalty together. For Ruby, her action would help her make conclusion on the compiled data. On the other hand, Mira's scanned reponse reveals what she would do to summarize the data as follows:



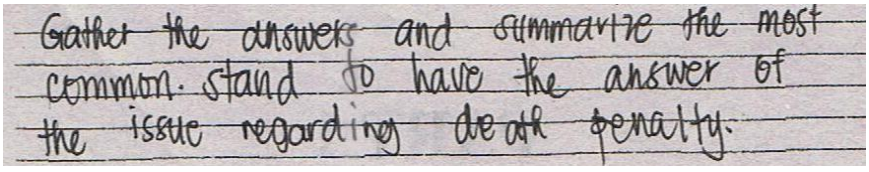
Mira would make a graphic chart or table to summarize classmates' stand on death penalty. The scanned response on how Cris would present her data is further shown below:



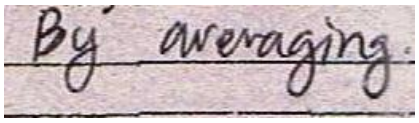
Cris would present his data by comparing the views. He would give his opinion and the opinions of his classmates and explaining the two different stands on death penalty. Janice also answered she would encode her data as shown below:



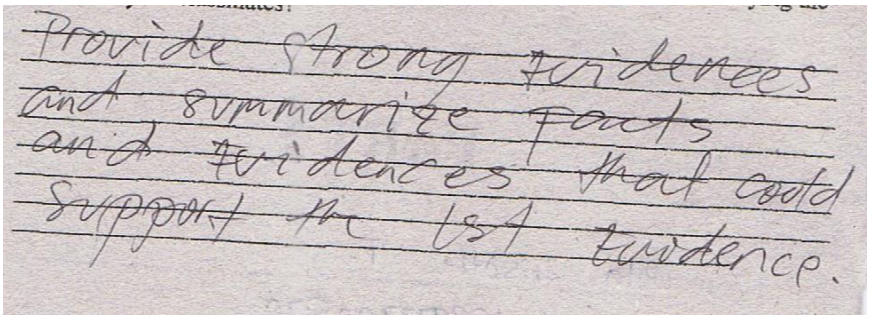
Janice would encode her data in Microsoft Excel. Another student also expressed her answer in details by starting with gathering of data and what to do with her data. Maki's response is found below:



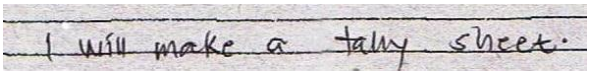
Makis would gather data and summarize the data by combining common stand. Maan also thought of averaging the data as shown below:



Maan would average her classmates' response on death penalty. She was thinking of numerical data that she would gather from her classmates. For another answer found below, Kit would provide support.



Kit would provide evidences and summarize the evidences to support it. Lanz' answer in scanned response below shows what she would do to summarize classmates' response:



Lanz would make a tally sheet to summarize classmates' stand on the issue of death penalty. The tallying was the initial step to arrive at frequency counts as well as percents of the stand of the students. Table 9 shows the mean, standard deviation and qualitative description of the data management skills of the students working on quantitative research.

Table 9: Mean, Standard Deviation and Qualitative Description of the Data Management Skills of the Students working on Quantitative Research

Questions	Mean	Std. Deviation	Qualitative Description
1. Data gathered for analysis and interpretation need to be encoded. For easy review of data in case some errors were committed, what is the best thing to do?	25.34	24.58	Slightly Skillful
2. Given a task to file students' grade, how will you arrange your file?	74.80	38.38	Skillful
3. How will you arrange your books in the shelves?	61.39	32.61	Skillful
4. You were given a task to provide a summary of your classmates' stand regarding the issue on death penalty. What will you do to give the summary after surveying the answer of your classmates?	38.27	39.35	Slightly Skillful
Data management	49.94	20.52	Moderately Skillful

Legend: 0-19.49% (not skillful), 19.50-39.49 %(slightly skillful), 39.50-59.49% (moderately skillful), 59.50-79.49% (skillful) and 79.50-100% (highly skillful).

Table 9 shows that the students are slightly skillful to skillful depending on the task to manage data given to them. Result shows that students are slightly skillful in organizing data for analysis and interpretation particularly in making ways for easy review of data in case some errors were committed (25.34) and in summarizing the data to provide summary of their classmates' stand regarding the issue on death penalty (38.27). Based on the responses of the students, they would not immediately solve their problems with the suggested solutions. For instance in reviewing the data in case errors were committed, students would think of the access to the raw data or accurately encoding the data but this would not directly answer the problem because even if they have access to the data, they still need to go over all the data before identifying the correct data needed. Similarly in the case of data encoding, this would only prevent the possibility of committing errors. Some also answered clerical error checking and technical methods. These would only check grammatical errors or misspelled words but would not be able to locate and check wrongly encoded data. Meanwhile, technical methods and use of computer programs would not also solve this problem but it is only part of the process of encoding the data. Only one student gave the correct answer of assigning number to the data. On the other hand, the students were slightly skillful in providing the summary of their classmates' stand regarding the issue of death

penalty because their responses describe the process they would undergo to come up with their data and analysis.

The result also showed that the students were skillful in arranging the file on students' grade (74.80) and arranging books in the shelves (61.39). In arranging students' grade, students' responses such as arranging the surnames alphabetically or arranging by category and alphabetically were the best answer because through this, it is easy to locate the grade of particular students. However, it did not reach highly skillful because some students would arrange by grade, or chronologically arranged or by other categories but failed to arrange it alphabetically. Hence, students cannot access the grade of the students' easily or would consume time in going over the whole data. Moreover, in arranging their books in the shelves, they were skillful because students responses on grouping the books by category such as by theme, type, section and others and arrange it alphabetically would make it easier to locate the books. However, some would arrange the book by category but not alphabetically; the others arrange by classification like type, subject, section or by preference. Problems in these arrangements would be encountered if there are huge numbers of books and other persons would locate the books in the respondents' shelves. Overall, the mean percent score average of the students in data management skills is moderately skillful (49.94).

The study of Whitlock, McPeek, Rausher, Rieseberg and Moore (2010) emphasized the importance of data management. They highlighted that the center of understanding the world are data. Meanwhile, this study also reveals that students exhibit different forms of file management similar to Nelson (2005) and Merlone (2005) for storage and access but not for destruction of the data.

However, similar to how students in this study revealed their data management skills, problems were also encountered in managing data that resulted to loss of data after they were collected. In short unreliable storage resulted to hard drive failure (Michener, Brunt, Helly, Kirchner, & Stafford, 1997, as cited by Whitlock, McPeek, Rausher, Rieseberg & Moore, 2010). Students in this study also mentioned the importance of storing the data in more than one storage to make sure that the data will be available when needed. Results of the study for the need of having both hardcopy and soft copy was also mentioned in the study of Moss (2012) because this caused problems in keeping records since data management applied in government files was purely digital and not accompanied by paper anymore.

Furthermore in this study, the use of catalog or Dewey Decimal system was mentioned by some of the respondents of the study as basis for arranging his/her books in the shelves. This is the standard and popular method used even in large libraries. However, there were still some problems encountered such as users who cannot find the desired item in the library catalog, and a user who is unable to locate the items on the shelves even if these were found in the library catalog. The study of Radford (1983) revealed that the source of the failure was the users' errors. Hence, just like in this study user errors also contributed in the failure of managing students' grade or arranging books in the shelves. Similar to the study of Merlone (2005), problems on students' files particularly on retention of notes were encountered even when there were existing laws and guidelines for school records.

3. Summary, Conclusion and Recommendations

Based on the analyzed data, it was found that most of the students have moderately skillful data management. The data management skills of the students are not yet fully achieved. Hence, each individual must be equipped with knowledge and skills in managing data even if standard methods of managing data already exist. As stated by Bakunas and Holley (2004) organizational skills such as data management skills should be taught as much as writing or computation skills are taught. It is recommended that there is still a need for improvement in students' data management skills. It is also recommended to include data management skills as part of topic in statistics and/ or research subjects. Teachers may also include similar instruction such as the team-based data management instruction of Clement, et al. (2017) where one of the objectives is for the students, faculty and other involved persons to learn to develop their own data management skills and services. This study may serve as initial procedure in exploring the factors that might influence variables such as statistical reasoning and result and / or the data can be used together with other possible variables. Other factors that might influence data management skills can also be explored.

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Appendix A

Data Management Skills

1. Data gathered for analysis and interpretation needs to be encoded. For easy review of data in case some errors were committed, what is the best thing to do?

_____
_____
_____

2. Given a task to file students' grade, how will you arrange your file?

_____
_____
_____

3. How will you arrange your books in the shelves?

_____
_____
_____

4. You were given a task to provide summary of your classmates' stand regarding issue on death penalty, what will you do to give the summary after surveying the answer of your classmates?

_____
_____
_____